The RUBBER AGE

September, 1941

AND

THERMAX

KALITE No. 1

These are good materials to use in increasing the loading of many stocks and still maintain good quality.

Both process easily—are economical and are today still available in good quantity for increased consumption.

R. T. VANDERBILT CO., INC.

230 Park Avenue, New York City

For better products rely on these

RUBBER CHEMICALS

DU PONT

REG. U.S. PAT. OFF.

ACCELERATORS

Thiazoline Type
2-MT*

Benzothiazole Types
Accelerator 531*
Acrin*
Zenite*
Zenite A*
Zenite B*

Thiuram Types
Thionex*
Tetrone A*

Guanidine Types
Di-ortho-tolylguanidine
Diphenylguanidine
Triphenylguanidine

Latex Accelerators
Accelerator 85*
Accelerator 89*
Accelerator 122*
Accelerator 552*
Tepidone*
Zenite Special*

Aldehyde-amine Types
Accelerator No. 8* (Formaldehyde-para-toluidine)
R & H 50-D*
Vulcanex*
Accelerator 737-50*
Ethylidene-aniline
Accelerator 737*
Accelerator 808*
Accelerator 833*

ANTIOXIDANTS

For Normal Aging Protection
Neozone A*
Neozone D*
Neozone E*

For Flex-Cracking Protection
Thermoflex*
Thermoflex A*

For Heat Resistance
Akroflex C*
Thermoflex A*

For White and Light-Colored Stocks
Antox*
Solux*
Permalux*
Parazone*

For Stiffening
Neozone* (standard)
Neozone B*
Neozone C*

For Latex
Dispersed Antox*

SPECIAL PURPOSE CHEMICALS

Barak*—an accelerator activator

RPA No. 2* and RPA No. 3*—crude rubber peptizers or softeners

Heliozone*—sun-checking inhibitor

Dispersed Heliozone*—sun-checking inhibitor for latex

Unicel*—sponge-blowing agent

Retarder W*—an accelerator retarder for benzothiazoles and thiurams

Aquarex D* and Aquarex MDL Paste*—wetting and dispersing agents for latex—also mold lubricants

Aquarex F*—a wetting and dispersing agent for latex

Copper Inhibitor X-872-A* offsets effect of copper on aging

COLORS

Rubber Dispersed and Dry Powders. Color Pastes for latex.

NEOPRENE AND NEOPRENE LATEX

For applications where oil, solvents, oxidation, sunlight and elevated temperatures are important factors.

*Trade mark exclusively owned and used by Du Pont.

Ask the Du Pont Technical Service Representative or write...

RUBBER CHEMICALS DIVISION

E. I. DU PONT DE NEMOURS & CO. (INC.), WILMINGTON, DELAWARE

THE RUBBER AGE, published monthly by The Palmerton Publishing Co., Inc., Printing Office, East Stroudsburg, Pa. Editorial and Advertising Offices at 250 West 57th Street, New York, N. Y. Entered as second class matter October 20, 1933, at the Post Office at East Stroudsburg, Pa., under the Act of March 3, 1879. Subscription in United States, $2.00 a year. Canada, $2.50; Foreign, $3.00. September, 1941. Vol. 49, No. 6.

HIGH STANDARD BLACK "Standardized" for you

Your processing methods demand a carbon black of constant quality . . . dependable, uniform and clearly defined as to its particular properties. Continental's method of manufacture assures just this. For each step throughout production of *each* grade of black at Continental's plant at Sunray, Texas, is a *separate* unit operation . . . rigidly controlled, sample-tested and checked in the plant laboratory. There are seven distinct grades of Continental black . . . from fast cure and easy processing to slow cure and hard processing . . . each determined with exact grading accuracy to meet practically every processing requirement. Each grade is clearly defined, too, and identified by its own grade symbol . . . an unfailing key to the right black, *every time*. "Standardize" your carbon black by standardizing your source of supply to meet consistently your processing needs with a black of outstanding quality and uniformity. All seven Continental blacks are listed and defined below for your convenience. Continental will be glad to confirm your grade selection.

CONTINENTAL CARBON COMPANY

295 MADISON AVENUE • NEW YORK, N. Y.

AKRON SALES OFFICE: Peoples Bank Bldg., Akron, Ohio • PLANT: Sunray, Texas

ONE OF THESE 7 GRADES IS *YOUR* black

CONTINENTAL A:
Fast Cure, Easy Processing

CONTINENTAL B:
Fast Cure, Medium Processing

CONTINENTAL C:
Medium Cure, Easy Processing

CONTINENTAL D:
Medium Cure, Medium Processing

CONTINENTAL E:
Medium Cure, Hard Processing

CONTINENTAL F:
Slow Cure, Medium Processing

CONTINENTAL G:
Slow Cure, Hard Processing

Continental

BOOKS on RUBBER

LATEX AND ITS INDUSTRIAL APPLICATIONS, by Marchionna (Vol. I). 1061 pp.—6 x 9 in . . $15.00

A completely authoritative and thoroughly indexed bibliography on all patents and published literature on Latex covering the period up to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS, by Marchionna (Vols. II and III). 1670 pp.—6 x 9 in. $20.00

An extensive and comprehensive supplement to Volume I, covering the period from June, 1932, to December, 1937. Includes abstracts on Latex and on Rubber Derivatives—rubber hydrochloride, cyclized rubber, hydrogenated rubber, etc. A necessary adjunct to Volume I.

Combination price, Vols. I, II and III $30.00

LATEX IN INDUSTRY, by Noble. 384 pp.—6 x 9 in. $7.00

A comprehensive text book which provides information directly useful to the chemist and manufacturer working daily with latex and to those who may contemplate its use. It is complete, practical, fully illustrated and indexed.

RUBBER—PHYSICAL AND CHEMICAL PROPERTIES, by Dawson and Porritt. 700 pp.—9 x 11 in. $12.50

A voluminous reference work presenting all available data on the physical and chemical properties of rubber. Outstanding and unique in that it is the only book of its kind available.

CHEMISTRY AND TECHNOLOGY OF RUBBER (A.C.S. Monograph No. 74), by Davis and Blake. 896 pp.—6 x 9 in. $15.00

An authoritative reference book on both the theoretical and practical aspects of rubber technology. A well-balanced and vital discussion, dealing not only with the theoretical phases, but with up-to-date manufacturing practices as well. Holds a logical appeal for the research investigator, the development engineer, and the student.

BIBLIOGRAPHY OF RUBBER LITERATURE, compiled by D. E. Cable

Bibliography for 1935 . . . . . $2.00
Bibliography for 1936 . . . . . 2.00
Bibliography for 1937 . . . . . 2.00
Bibliography for 1938-1939 . . . . . 4.00

All volumes in Cloth Bindings—6 x 9 inches

These bibliographies serve as accurate and complete guides to the literature published on rubber and allied products throughout the world during the periods mentioned. Invaluable to the technologist and librarian whose work requires constant reference to publications and technical articles on rubber.

RUBBER AND ITS USE, by Harry L. Fisher. 128 pp.—5½x8½ in. Clothbound, Illustrated $2.25

This book is a non-technical treatise on the nature, history, manufacture and use of rubber, plus some information relative to synthetic rubbers and rubber derivatives. The ten chapters cover the History of the Rubber Industry; Sources and Production of Crude Rubber; Properties of Crude and Vulcanized Rubber, and the Importance of Vulcanization; Compounding and Vulcanizing Rubber; Manufacturing Rubber; Latex Manufacturing Processes; Synthetic Rubbers; Rubber Derivatives. A list of reference works for supplemental reading and a subject index are included.

CHEMISTRY AND TECHNOLOGY OF RUBBER LATEX, by Flint. 715 pp.—6x9 in. $14.00

The latest text book on latex covering all the general and technical phases of the subject. A valuable and comprehensive source of information for all those interested in this increasingly important industry. Covers a wide variety of subjects from history and source of latex to precise compounding data and manufacturing prices.

●

THE RUBBER AGE

250 West 57th St., New York City

Add 2% for Sales Tax on copies sent to N. Y. City addresses.

For Compounding NEOPRENE Stocks—

K & M LIGHT MAGNESIUM OXIDE

For the compounding of NEOPRENE stocks, Cyanamid recommends LIGHT MAGNESIUM OXIDE, produced by Keasbey & Mattison Company, one of the country's oldest and most reliable manufacturers of magnesia products.

MOISTURE-PROOF CONTAINERS—K & M Light Magnesium Oxide, identified by the orange label, is packed in 50-lb. corrugated

cartons with inner liners of crepe paper. These crepe liners are, in turn, enclosed in special moisture-proof liners which are sealed with latex strips to insure the greatest possible protection against moisture absorption. As a result original uniformity is preserved. Losses caused by moisture absorption are less than ½ of 1% during a period of three months' storage under normal storage conditions, as compared to much higher losses in magnesium packed in other types of containers. Samples of K & M Light Magnesium Oxide will be sent you on request.

FOR GENERAL COMPOUNDING PURPOSES—

K & M MAGNESIUM CARBONATE

In a Special Package

K & M Magnesium Carbonate comes to you in a specially made, four-ply multiwall paper bag container which is additionally reinforced against moisture absorption by water-repellent Scutan Paper next to the innermost kraft wall. Strip sealed and sewed to give greater

shipping strength. Remains clean and siftproof. Easy to handle and store. Low tare weight reduces freight bills. Standard package—50 lbs. net. Distributed by

AMERICAN CYANAMID & CHEMICAL CORPORATION

A Unit of American Cyanamid Company

30 ROCKEFELLER PLAZA • NEW YORK, N. Y.

Sales Representatives to the Rubber Industry and stock points: Ernest Jacoby & Company, Boston, Mass.; H. M. Royal, Inc., Trenton, N. J., and Los Angeles, Calif.; Herron & Meyer, Chicago, Ill.; Akron Chemical Company, Akron, Ohio.

Sincerest FLATTERY...

In 1880, Royle pioneered the extruding machine and our constant endeavor has been to maintain leadership in the field through increasingly excellent design. Pride in our developments thus far is enriched by the awareness of imitation — the sincerest kind of flattery. We confidently believe our further accomplishments will richly deserve imitation.

8½" Royle expansion-type gate-head Strainer, with manually-operated breech-lock head . . . introduced more than two years ago.

61ST. ROYLE'S YEAR OF EXTRUDING MACHINE MANUFACTURE

JOHN ROYLE & SONS

Since 1855

ROYLE PATERSON N J

AKRON, J. C. CLINEFELTER · LOS ANGELES, LOMBARD SMITH CO. · LONDON, JAMES DAY (MACHINERY) LTD.

THE NEW DAY IN RED RUBBER COMPOUNDING

HIGH TENSILE STRENGTH NOTABLE ELONGATION

Up to 20 volumes of added pigment (over 100% by weight) Mapico Red No. 297 develops higher tensile strength values than either zinc oxide or furnace carbon. The breaking elongation of the Mapico iron oxide mixes is definitely higher than that of zinc oxide or furnace carbon at all loadings.

MAPICO NO. 297 RED RUBBER IS *Good* RUBBER

•

MAPICO RED NO. 297

PURE OXIDE OF IRON

Send Us Your Red Rubber Problems

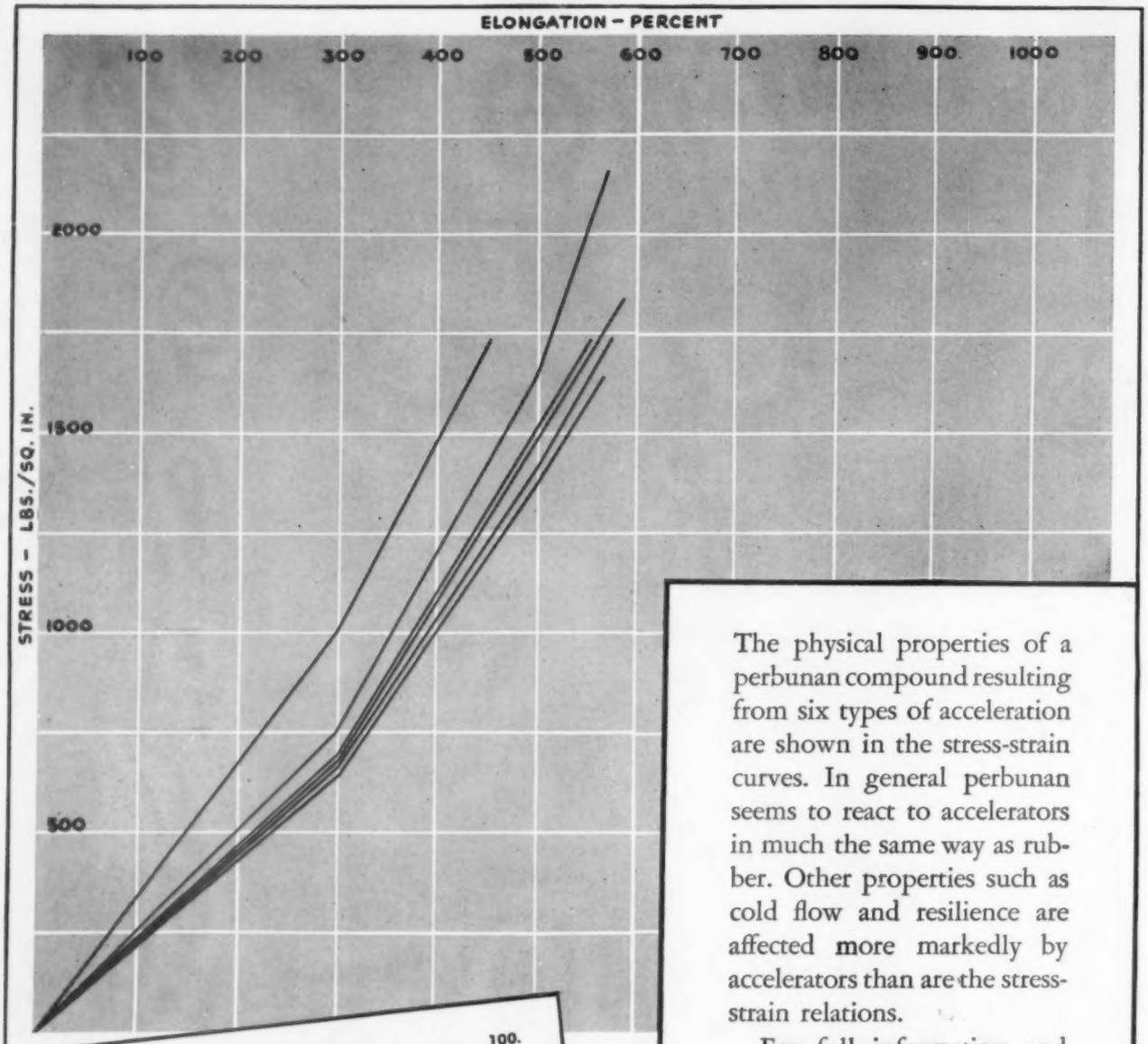
UNIT OF COLUMBIAN CARBON COMPANY

MAGNETIC PIGMENT CO.

MANUFACTURER

BINNEY & SMITH CO., *Distributor*, 41 EAST 42ND ST., NEW YORK, N. Y.

Accelerators for Perbunan



BASE FORMULA

PERBUNAN	100.
SULFUR	1.5
ZINC OXIDE	5
STEARIC ACID	1.
DIBUTYL PHTHALATE	20.
FLECTOL H	2.
SOFT BLACK	50.

	A	B	C	D	E	F
SANTOCURE	—	—	.30	.375	.75	—
EL SIXTY	.75	1.	.45	—	—	—
D P G	.20	—	—	.375	—	.18
THIURAD	—	—	—	—	—	—
HARDNESS	53	52	52	53	53	54

The physical properties of a perbunan compound resulting from six types of acceleration are shown in the stress-strain curves. In general perbunan seems to react to accelerators in much the same way as rubber. Other properties such as cold flow and resilience are affected more markedly by accelerators than are the stress-strain relations.

For full information and technical service, inquire: MONSANTO CHEMICAL COMPANY, Rubber Service Dept., Akron, Ohio.

LET'S GO! U.S.A. KEEP 'EM FLYING!

MONSANTO CHEMICALS
SERVING INDUSTRY . . . WHICH SERVES MANKIND

GASTEX TRADE MARK

PELLETEX TRADE MARK

Behind these trade marks stand ten protectors of quality.

No. 1 UNIFORMITY

Every step of the manufacturing process is under scientific control, insuring a uniform product, free from grit and volatile matter. Rate of cure is constant.

DEFENSE FORMULAE

Are you in the shadow of the 8 ball as a result of modifying your formulations to aid rubber conservation?

Perhaps GASTEX and PELLETEX is the answer.

Whether it's a question of cutting down on rubber, or the substitution of reclaim, or the introduction of synthetics, these special process blacks may solve your compounding problems.

At any rate, why not look into the unique properties of GASTEX and PELLETEX (dustless GASTEX) — with the cooperation of General Atlas Carbon Division's Technical Department?

GENERAL ATLAS CARBON DIVISION

OF GENERAL PROPERTIES COMPANY, INC.

GASTEX TRADE MARK

SIXTY WALL STREET, NEW YORK, N. Y.

PELLETEX TRADE MARK

Plants: Pampa, Tex.; Guymon, Okla.

SALES REPRESENTATIVES

ERNEST JACOBY & CO.
Boston

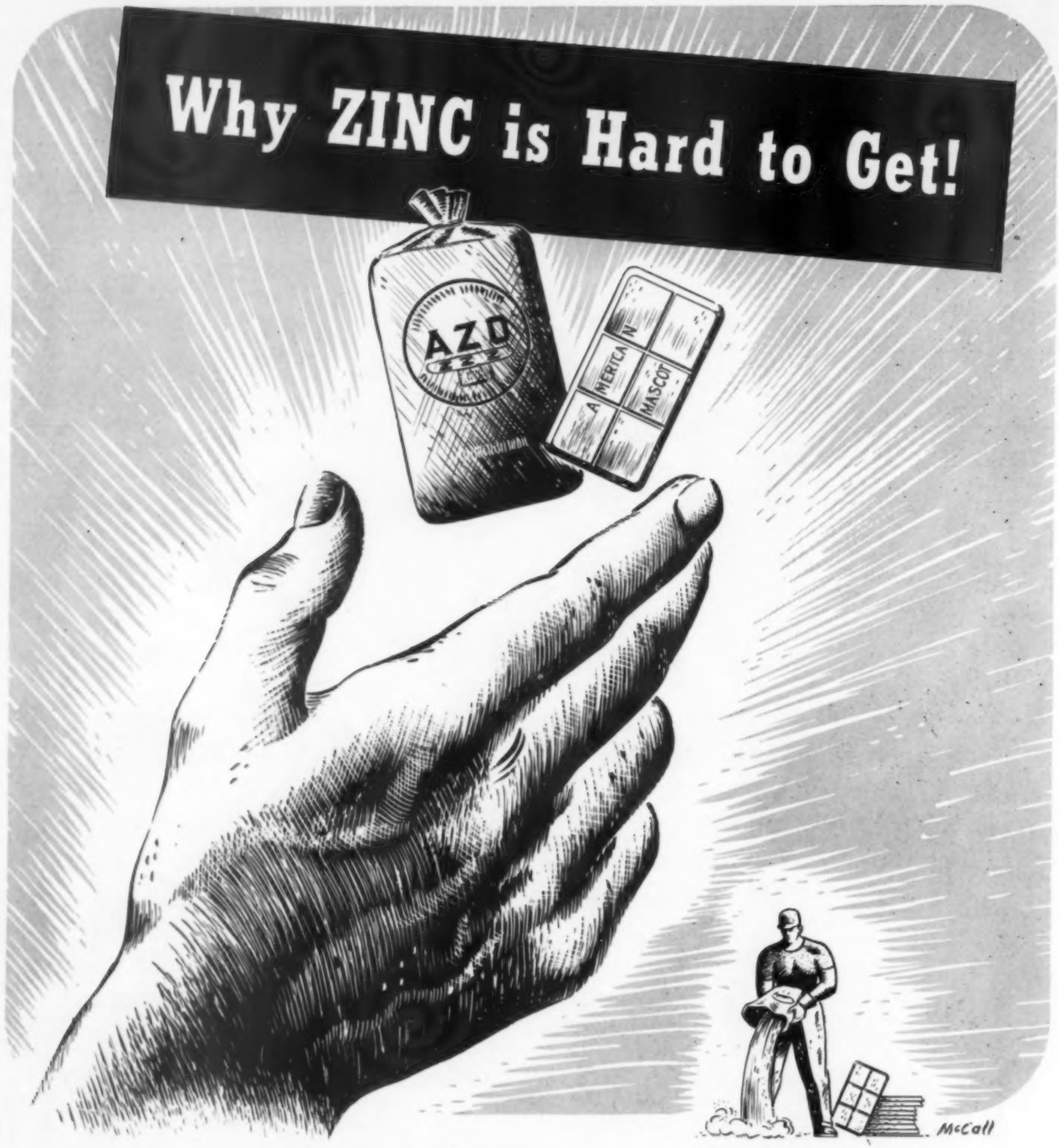
THE C. P. HALL CO. OF CALIF.
Los Angeles

HERRON & MEYER
Akron • New York • Chicago

H. M. ROYAL, INC.
Trenton, N. J.

ST. LAWRENCE CHEMICAL CO., LTD.
Toronto • Montreal

Why ZINC is Hard to Get!



With the declaration of war in Europe, and especially after the fall of France, an unprecedented demand appeared for zinc metal and zinc oxide.

The national defense program enforced priorities. Civilian demands increased with the general business upturn. Great Britain looked to the United States for ever-increasing aid. Other nations, losing their supply sources, sought zinc from this country.

American Zinc, like the entire industry, is striving to meet this great call for zinc . . . more zinc. Every facility is being employed in an "all out" effort to satisfy the unprecedented demand for every zinc product.

AZO
ZINC OXIDES

AMERICAN ZINC SALES CO.

Distributors for

American Zinc, Lead & Smelting Co.

Columbus, O., Chicago, St. Louis, New York

—"CAN YOU MAKE THIS FROM RECLAIM?"

Every little while someone whom we have never seen brings in something we never saw before, to see if it can be made from reclaimed rubber.

Seriously, though, when the world war is over you are going to find many articles made regularly from reclaim, that were never made from it before.

In the present emergency reclaimed rubber has stepped in to replace crude rubber and to assist in our nation's defense program.

PEQUANOC RECLAIMS

are uniform because they are produced under strict supervision and laboratory control to meet exactly the needs of each manufacturing purpose.

If you are developing a new product, consult us freely about the availability of Pequanoc Reclaims to meet your particular requirements.

PEQUANOC RUBBER CO.

QUALITY RECLAIMS FOR SPECIFIC PURPOSES

BUTLER **NEW JERSEY**

SALES REPRESENTATIVES

Robert Knoblock
2301 Lincoln Way West
Mishawaka, Indiana

Harold P. Fuller
31 St. James Avenue
Boston, Mass.

E. B. Ross
No. 1 Toronto Street
Toronto, Ontario, Canada

Burnett & Co. (London) Ltd.
189 Regent Street
London W. 1, England

USMC Top Cementing Machine—Model RB

USMC Top Cementing Machine — Model RB
Single

THIS machine has displaced the slow, untidy and wasteful hand method of cementing canvas tops, gaiter, gum and boot linings, automatic fastener slides, and other miscellaneous parts used in the manufacture of waterproof footwear.

The USMC Top Cementing Machine—Model RB can be fitted for either single or double cementing in widths of 3/16" to 2" for single and 1/4" to 1 1/4" for double work.

It may also be equipped with double attachment for work requiring variable marginal cement lines within ranges mentioned above.

USMC Top Cementing Machine — Model RB
Double

UNITED SHOE MACHINERY CORPORATION
BOSTON, MASSACHUSETTS

REINFORCING
CALCIUM
CARBONATE

HIGH TENSILE • HIGH TEAR RESISTANCE
LOW MODULUS • SMOOTH PROCESSING
LOW VOLUME COST

CALCENE

PITTSBURGH PLATE GLASS COMPANY
Columbia Chemical Division
30 ROCKEFELLER PLAZA
NEW YORK, N.Y.

Chicago • Boston • St. Louis • Pittsburgh • Cincinnati • Cleveland • Minneapolis • Philadelphia • Charlotte

The Demands of Excellence

ARE EXACTING

The quality of St. Joe, American Process, Zinc Oxide was fixed years ago. Long before 1927, when ground was broken at Josephtown, Pa. for the construction of a smelter, this Company determined to produce the highest quality zinc oxide obtainable. The desire to maintain this recognized, unvarying quality still inspires every operation of hand and machine, from ore to oxide. This insistence upon perfection is not the easiest way; it is, rather, the natural result of a policy established in 1865 by this organization — a policy which has made this Company one of the leading factors in its field.

ST. JOSEPH LEAD COMPANY

250 PARK AVENUE, NEW YORK, N. Y.

MADE BY THE LARGEST PRODUCER OF LEAD IN THE UNITED STATES

THEY MAKE THE GOING EASIER..

C-700 ALUMINAS

Here are reinforcing pigments that help to lessen the shock of shortages in other materials. No distress substitute, these C-730 Hydrated Aluminas, but tried and proved pigments which now step into rightful position in rubber goods production.

Nor are they being favored with the sissy jobs, either. C-700 Aluminas are used where the going is tough, in rubber heels, truck tire inner tubes, and the like. High in resilience and rubbery properties with high pigment loading, offering good resistance to abrasion, high strength at elevated temperatures, high modulus with high elasticity, superior aging characteristics: these are properties obtained with C-700 Hydrated Aluminas reinforcing pigment.

You get a high modulus in the uncured compound, and unusually good tackiness of uncured stock. The rubber has high resistance to hot and cold tear, low heat build-up and good heat transfer, low specific gravity, good dielectric properties. The pigment particles are extremely fine and uniform. They impart no odor to the rubber, and no color, thereby permitting color in products heretofore limited to black.

We'll gladly send you further data on C-700 Hydrated Aluminas, or samples for trial. Write ALUMINUM COMPANY OF AMERICA (*Sales Agent for* ALUMINUM ORE COMPANY) 1970 Gulf Building, Pittsburgh, Pennsylvania.

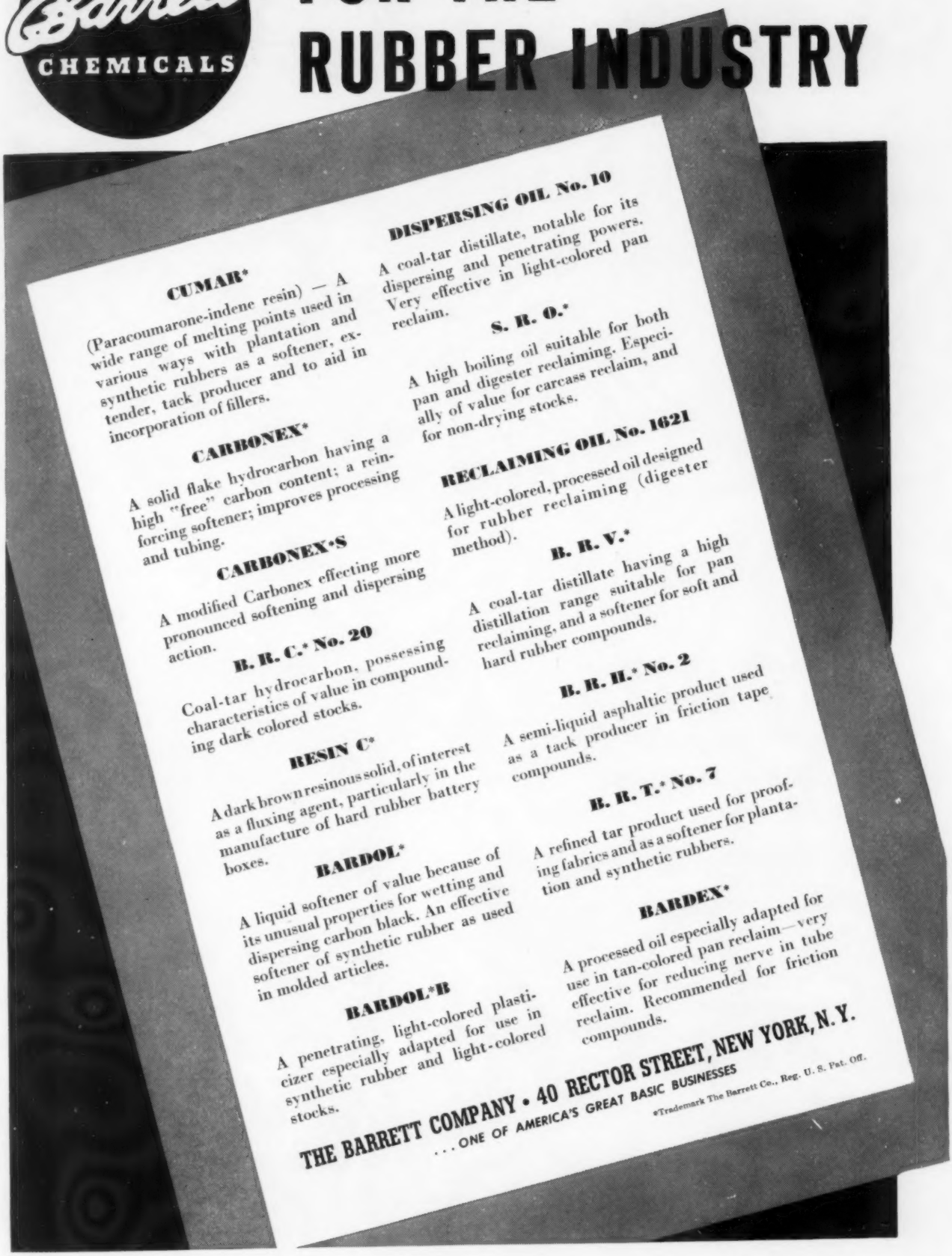
Reg. U. S. ALORCO Pat. Off.

ALUMINUM ORE COMPANY

ALUMINUM AND FLUORINE COMPOUNDS

Barrett CHEMICALS

FOR THE RUBBER INDUSTRY



CUMAR*

(Paracoumarone-indene resin) — A wide range of melting points used in various ways with plantation and synthetic rubbers as a softener, extender, tack producer and to aid in incorporation of fillers.

CARBONEX*

A solid flake hydrocarbon having a high "free" carbon content; a reinforcing softener; improves processing and tubing.

CARBONEX-S

A modified Carbonex effecting more pronounced softening and dispersing action.

B. R. C.* No. 20

Coal-tar hydrocarbon, possessing characteristics of value in compounding dark colored stocks.

RESIN C*

A dark brown resinous solid, of interest as a fluxing agent, particularly in the manufacture of hard rubber battery boxes.

BARDOL*

A liquid softener of value because of its unusual properties for wetting and dispersing carbon black. An effective softener of synthetic rubber as used in molded articles.

BARDOL*B

A penetrating, light-colored plasticizer especially adapted for use in synthetic rubber and light-colored stocks.

DISPERSING OIL No. 10

A coal-tar distillate, notable for its dispersing and penetrating powers. Very effective in light-colored pan reclaim.

S. R. O.*

A high boiling oil suitable for both pan and digester reclaiming. Especially of value for carcass reclaim, and for non-drying stocks.

RECLAIMING OIL No. 1621

A light-colored, processed oil designed for rubber reclaiming (digester method).

B. R. V.*

A coal-tar distillate having a high distillation range suitable for pan reclaiming, and a softener for soft and hard rubber compounds.

B. R. H.* No. 2

A semi-liquid asphaltic product used as a tack producer in friction tape compounds.

B. R. T.* No. 7

A refined tar product used for proofing fabrics and as a softener for plantation and synthetic rubbers.

BARDEX*

A processed oil especially adapted for use in tan-colored pan reclaim—very effective for reducing nerve in tube reclaim. Recommended for friction compounds.

THE BARRETT COMPANY • 40 RECTOR STREET, NEW YORK, N. Y.

. . . ONE OF AMERICA'S GREAT BASIC BUSINESSES

*Trademark The Barrett Co., Reg. U. S. Pat. Off.

Stauffer
CHEMICALS
SINCE 1885

RUBBER SULPHURS

COMMERCIAL RUBBERMAKERS' SULPHUR
Tire Brand, 99½% Pure

REFINED RUBBERMAKERS' SULPHUR
Tube Brand, 100% Pure

•

CRYSTEX (INSOLUBLE) SULPHUR

•

SULPHUR CHLORIDE
CAUSTIC SODA
CARBON BISULPHIDE
CARBON TETRACHLORIDE

Stauffer Chemical Co.
420 LEXINGTON AVE., NEW YORK, N. Y.
230 NO. MICH. AVE., CHICAGO, ILL.
624 CALIFORNIA ST., SAN FRANCISCO, CAL.
555 SO. FLOWER ST., LOS ANGELES, CAL.
424 OHIO BUILDING, AKRON, OHIO
FREEPORT, TEXAS APOPKA, FLORIDA

for Busy Men
WITH
PROCUREMENT AND PRODUCTION PROBLEMS

NEVER before has the Exposition of Chemical Industries been able to do as much as it can this year to help busy men who are worried by procurement and production problems. By spending a few days at this year's Chemical Exposition, you can accomplish more than at any other time or place in the world—including your own office.

Three great floors of Grand Central Palace full of exhibits by the very top strata of suppliers—each of them devoting a week to the service of the chemical industries when such service is so important—each making it easy for you to see the actual products displayed and demonstrated—each providing chemical and engineering specialists eager to welcome consultation and discussion.

AT THIS YEAR'S CHEMICAL INDUSTRIES EXPOSITION
DECEMBER 1-6, 1941

The largest number of exhibits in more than a decade — chemical processing equipment, appliances, instruments, chemicals and chemical products, materials and supplies.

The most varied and helpful group of exhibits ever staged for the benefit of the chemical process and related industries.

Exhibits staged by leading manufacturers who, by exhibiting, show that they are exerting their utmost efforts to serve industry.

Think what that means to you as a help in solving procurement and production problems!

Come to the Chemical Exposition — bring your associates. See that all your key men attend. It's one of the most important things you can do at this time.

18th EXPOSITION OF CHEMICAL INDUSTRIES
GRAND CENTRAL PALACE, NEW YORK, DEC. 1-6, 1941
Managed by International Exposition Co.
DEDICATED TO SPEEDING UP AMERICA'S INDUSTRY FOR THE DEFENSE PROGRAM
536

GAS-FREE PROCESSING

UNIQUE SOLVENT RESISTANCE

LOW PERMEABILITY

FASTER PRODUCTION

Get 'em all with TYPE FA

"Thiokol" synthetic rubber Type FA offers immediate operating benefits. It works faster and easier on the mill. Its practical elimination of undesirable processing gases wins the cooperation of men right down the line. With Type FA, production moves fast.

Low permeability and unique solvent resistance distinguish Type FA. It is an ideal synthetic for finished products requiring these properties; an excellent all-round synthetic for all basic rubber products.

Don't lose any time getting the facts on Thiokol synthetic rubber Type FA. It's important. It's *available*.

THIOKOL CORPORATION, TRENTON, N. J.

Thiokol

Reg. U. S. Pat. Off.

SYNTHETIC RUBBER

"AMERICA'S FIRST"

Primed for action!

Crude and Scrap

RUBBER

ALSO

HARD RUBBER DUST

•••

H. MUEHLSTEIN AND COMPANY, INC.,

122 E. 42nd STREET,
NEW YORK, N.Y.

BRANCHES
CHICAGO BOSTON
LOS ANGELES AKRON LONDON

SERVICE + QUALITY

STANDARDIZED QUALITY

LATEX

· NORMAL ·
CONCENTRATED · PROCESSED

Consistent Standardized Uniformity

Concentrates from 50% to 75% solids content for all industrial uses.

Specially processed latex and compounds to meet new and old requirements.

We offer many processed types and formulas suitable for particular applications, and also supply to buyers' own specifications.

Large Stocks Available for Prompt Delivery

Trade Mark

HEVEATEX CORPORATION

78 GOODYEAR AVE. MELROSE, MASS.

Trade Mark

NEW YORK, N. Y. CHICAGO ILL. AKRON, OHIO. LOS ANGELES, CAL.

To WHITEN and BRIGHTEN

Rubber Products

is right down the TITANOX alley!

SOUND reason dictates that TITANOX-A (titanium dioxide) is the logical pigment for making rubber products white and bright. The opacity and tinting strength of TITANOX-A are so great that a minimum loading will produce desired whiteness and brightness. In addition TITANOX-A is chemically inert and will not react with other components of the mass.

Samples of TITANOX pigments suitable for compounding with rubber will be sent upon request.

Our Service Department will gladly co-operate in the solution of technical problems involving the use of white pigments.

TITANIUM PIGMENT CORPORATION
SOLE SALES AGENT

111 Broadway, New York, N. Y.
104 South Michigan Avenue, Chicago, Ill. • National Lead Company (Pacific Coast Branch)
2240 24th St., San Francisco, Cal.

THE CLEVELAND LINER & MFG. CO.
TRADE
CLIMCO
MARK
CLEVELAND, OHIO, U.S.A.

CLIMCO PROCESSED LINERS

The Accepted Standard of Quality for the Rubber Industry

ENTHUSIASTICALLY received 19 years ago, Climco Processed Liners are today preferred throughout the industry.

Now that defense conditions demand more and faster production, the advantages of Climco Processed Liners are of even greater importance. For Climco Processing insures better separation, greatly increases the life of the liner and eliminates stock adhesions. With Climco Processed Liners on the job, production at the cutting table flows smoothly and without interruption.

A trial of Climco Processed Liners will soon demonstrate to you their superior quality and greater durability—and explain why most leading companies have standardized on Climco.

★ ★ ★

THE CLEVELAND LINER & MFG. CO.
CLEVELAND, OHIO

The RUBBER AGE

One of the World's Outstanding Rubber Journals

M. E. LERNER
Editor

M. CLIFFORD
Production Manager

R. E. GAINES
Circulation Manager

PETER P. PINTO
General Manager

VOLUME 49
NUMBER 6

CONTENTS FOR SEPTEMBER, 1941

Thermoplastic Plastic Materials—*By J. Delmonte* 393

New Cord for Automobile Tires 397

"Hanging" Roof Saves Floor Space in Firestone's New Dry-Room 398

X-Ray Studies of Rubber. Part IV. Finely Divided Crystalline Fillers—*By George L. Clark and Robert L. LeTourneau* 399

Rules on Priorities Orders and Actions 405

Better Management for the Rubber Factory. II. Overhead —*By Arthur Roberts* 406

Latex-Sprayed Cactus Fiber for Upholstery 408

•

REGULAR DEPARTMENTS

New Equipment Section .. 425
Book Reviews 431
Editorial 409
Late Domestic News 410
Financial News 417
Names in the News 414
Coming Events 415
Obituaries 420
Los Angeles News 419
Rubber, Cotton Markets .. 434
Chemical Markets 436
Statistics 437
Market Place 441
Classified Ads. 445

•

Also Publishers of:

RUBBER RED BOOK
Directory of the Rubber Industry
Published Biennially

ANNUAL BIBLIOGRAPHIES OF RUBBER LITERATURE
Compiled by D. E. Cable, Ph.D.
First issue covers year 1935

LATEX IN INDUSTRY
By Royce J. Noble, Ph.D.
Text Book on Latex

LATEX AND ITS INDUSTRIAL APPLICATIONS (Vol. I)
By Frederick Marchionna
Bibliography of latex patents and literature to June, 1932.

LATEX AND RUBBER DERIVATIVES AND THEIR INDUSTRIAL APPLICATIONS (Vols. II & III)
By Frederick Marchionna
Bibliography of latex patents and literature from June, 1932 to January, 1937; rubber derivatives to January, 1937.

Published on the 15th of each month by

PALMERTON PUBLISHING COMPANY, INC.

Printing office,
East Stroudsburg, Pa.

Editorial and Advertising Offices,
250 West 57th St., New York City

New England Representative—F. ROYAL CAREY, P.O. Box 133, Providence, R. I.
Western Representative—IRVING V. KOCH, 64 East Lake St., Chicago, Ill.

Entered as Second Class Matter, October 20, 1933 at the Post Office at East Stroudsburg, Pa., under Act of March 3, 1879. Subscription Rates: Domestic, $2.00 a year; Canada, $2.50; Foreign, $3.00. Single copies up to 3 months old, 25 cents; over 3 months old, 50 cents. Telephone COlumbus 5-2923, 5-2924.

Contents Copyrighted 1941 by the Palmerton Publishing Company, Inc.

Indexed in Industrial Arts Index. OFFICERS: P. L. Palmerton, President; E. D. Osborn, Vice-President and Secretary; Peter P. Pinto, Treasurer.

USE Sunproof FOR WEATHER RESISTANCE

Sunproof

PROTECTS
RUBBER UNDER TENSION

Sunproof

INHIBITS CRACKING AND
TACKINESS OF CERTAIN
SYNTHETIC RUBBERS

Defense rubber products of many kinds must withstand severe weathering and aging conditions. Sunproof is recommended for hose and insulated wire cover stocks, airplane and automotive rubber parts, molded specialties, rubber boots and shoes, and special types of tires.

Naugatuck Chemical
DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK, N. Y.

The **RUBBER AGE**

VOL. 49 No. 6 **SEPTEMBER, 1941**

Thermoplastic Plastic Materials

No. 2 of a Series of Four Articles on Plastics

By J. DELMONTE

Technical Director,
Plastics Industries Technical Institute, Los Angeles, Calif.

IN the first article of this series on plastic materials (RUBBER AGE, August, 1941) thermosetting materials were compared and some of the problems of preparing them were discussed. In this article thermoplastic materials will be analyzed. While on a volume basis the production of phenolic and alkyd resin exceeds the production of all other plastic materials, there are nevertheless a greater variety of thermoplastic substances. It is more than likely that in light of present shortages of thermosetting compositions, due to the use of formaldehyde as one of the initial reagents, the role of thermoplastics will become increasingly important.

Thermoplastic materials of commercial importance are derived primarily from cellulose derivatives and synthetic resins. Among the synthetic resins those materials possessing the vinyl grouping are highly reactive, forming long chain molecules suited for plastic formulation as described in paragraphs below. Polymerization of materials containing the vinyl groups forms a thermoplastic structure comprised essentially of carbon to carbon linkages as components in the chain. Representative members of this series are:

$CH_2=\overset{H}{\underset{\vert}{C}}-R_1$	where R_1 is	Compound
	$COOH$	Acrylic Acid
	Cl	Vinyl Chloride
	C_6H_5	Styrene
	$O-CO-CH_3$	Vinyl Acetate
	$-CH=CH_2$	Butadiene
	$-C=CH_2$ (with CH_3 below)	Isoprene

The resemblance to the butadiene and isoprene structure should at once be apparent. Naturally there are many more members with closely allied structures, particularly those plastics classified as copolymers. There is an increasing amount of work being done in the field of copolymerization of two or more primary monomers, developing long chain polymers with char-

FIG. 1—Polyvinyl butyral sheet used in safety glass.

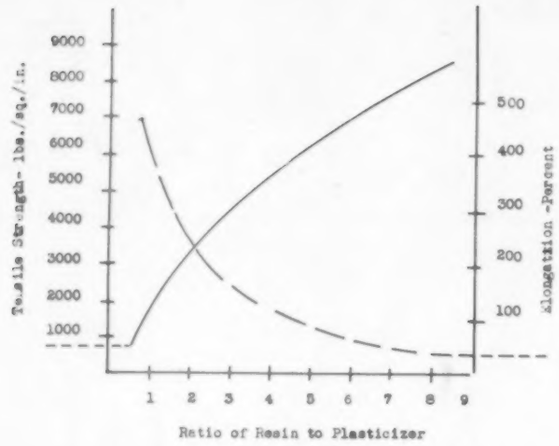


FIG. 2—Polyvinyl Resin Characteristics.

acteristics differing from the pure polymers of either of the components. For example, copolymers of butadiene with styrene as well as acrylic nitrile are already well known to rubber chemists.

Plastics From Vinyl Resins

There are numerous thermoplastics falling under the general classification of polyvinyl resins, such as:

Polyvinyl Acetate	Polyvinyl Chloride
Polyvinylidene Chloride	Polyvinyl Alcohol
Polyvinyl Chloride-Acetate	Polyvinyl Acetal

The polyvinyl acetal group is comprised of a group of aldehyde modified polyvinyl alcohols, the two most important members of which are the formaldehyde modified material and the butyraldehyde modified vinyl resin. The latter material is now used exclusively as the flexible transparent plastic layer in safety glass construction. Rubber-like properties of this plastic can be appreciated in Figure 1.

There are several members of the polyvinyl resins which have enjoyed the description of "rubber-like", implying considerable elongation under stress. This elongation is due in most cases to plasticizer additions: tricresyl phosphate for polyvinyl chloride and the polyvinyl copolymer; dibutyl diglycollate for polyvinyl butyral; water for polyvinyl alcohol; and favorable molecular orientation by cold stretching for polyvinylidene chloride filaments. As would be expected, properties such as elongation and tensile strength are dependent upon plasticizer content (see Figure 2). For elongations comparable to natural rubber, chloroprene or butadiene copolymers, the polyvinyl resins sacrifice tensile strength.

Another significant feature of the elongation properties of "rubber-like" polyvinyl resins is that the rate of deformation is also a slower process. However, there are definite advantages in these polyvinyl plastics, such as their chemical inertness to oils, and, for some of them, complete imperviousness to concentrated hydrochloric and nitric acids.

Among the popular applications of polyvinyl resins are wearing apparel, where the transparent flexible stocks are highly popular in belts (Figure 3), suspenders, and shoes. Also of note are the adaptation of flexible, plasticized polyvinyl chloride films as waterproof coatings to cloth and wearing apparel.

There are several methods of preparing polyvinyl resins. In some reactions they appear as by-products, as in natural gas sources or preparation of dihydric alcohols. However, the simplest way to illustrate the formation of a vinyl resin monomer is the reaction of hydrochloric acid upon acetylene gas:

$$\underset{\text{Acetylene}}{CH\equiv CH} + HCl \rightarrow \underset{\text{Vinyl Chloride}}{CH_2=CH-Cl}$$

Pyrolysis of petroleum by-products with superheated steam and subsequent chlorination will also form vinyl halides, which are readily polymerized. The polymerization of the monomers in most cases is carried out in solution, with a subsequent precipitation of polymer. In connection with actual compounding of the polymers with dyes, fillers, plasticizers, etc., the addition of stabilizers might be noted. These are added to reduce the tendency of some of the polyvinyl resins to decompose at high temperatures in presence of iron, zinc, or brass.

The copolymer, polyvinyl chloride-acetate, enjoys the widest market among these resins. Combining the best qualities of the vinyl chloride and vinyl acetate, it has already established itself firmly in the plastic field. Available in molecular weights ranging from 6000 to 20,000, it fulfills important functions as lacquers for food cans, sheets and rods, and, more recently, injection molded articles and extruded strips.

Plastics from Acrylic and Methacrylic Esters

Noted in the plastics industry as crystal clear transparent solids, acrylic resins play an entirely different role in the rubber industry as a basic constituent in one of the butadiene copolymers. The latter material is acrylic nitrite. However, in the field of plastics, methyl methacrylate is the best known of the various esters available. Requiring raw materials of acetone, air, sodium cyanide, and organic alcohols, the various esters are synthesized. A general reaction in preparation of methacrylic esters from acetone cyanohydrin follows:

$$\underset{\substack{|\\CN}}{CH_3-COH-CH_3} + R-OH + H_2SO_4 \rightarrow \underset{\substack{|\\CH_3}}{CH_2=C-COOR} + NH_4HSO_4$$

The identity of the methacrylic ester depends upon the nature of the reacting alcohol. For example, methyl alcohol will form methyl methacrylate which is readily polymerized by heat in the presence of oxygen bearing catalyst.

The best known industrial forms of polymethyl methacrylate are as transparent sheets, rods, and tubes and molding materials. Representative of fabricated

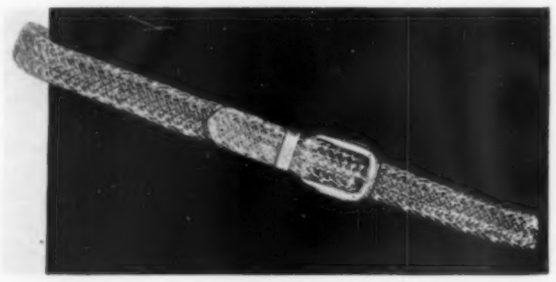


FIG. 3—Flexible belt made from polyvinyl resin.

shapes is the vanity bench shown in Figure 4. Not only are they among the clearest of the plastics, but also very stable, having little or no tendency to discolor in sunlight. At present their greatest outlet is on aircraft, being fabricated and formed to manufacture bomber noses, cockpit enclosures, and windshields. The better grade of clear sheet stock is cast from liquid monomeric resin, whereas less expensive varieties are available by pressing molding powders.

Some of the higher homologues of the acrylic, methacrylic and ethacrylic ester series possess rubber-like properties, though these characteristics have not been utilized to any great extent. Much work is in progress investigating the effect of copolymerization of acrylic resins.

Plastics from Polystyrene

Associated with polystyrene are its outstanding dielectric characteristics, excellent chemical resistance, low density (1.05 to 1.07), and practically negligible water absorption. It is small wonder that polystyrene is playing an increasingly important role in the plastics field, with this array of desirable properties to draw upon.

Styrene may be prepared by cracking ethylbenzene at high temperatures in a heated iron tube. The general reaction follows:

$$C_6H_5—C_2H_5—Heat \rightarrow \underset{\text{Styrene}}{C_6H_5—CH=CH_2}+H_2$$

Polymerization of styrene is usually carried out with the aid of heat, the double bond of the vinyl grouping ($CH_2 = CH —$) opening up to form a long chain molecule. The average molecular weight of commercial grades of the material is placed around 125,000. Under certain conditions of long time polymerization, molecular weights of 600,000 have been realized. A portion of the polystyrene molecular structure is indicated below:

$$\begin{array}{llll} CH—CH_2— & CH— & CH_2— & CH—CH_2— \\ | & | & & | \\ C_6H_5 & C_6H_5 & & C_6H_5 \end{array}$$

Styrene in its liquid monomeric form, as pointed out before, is an important component of a butadiene copolymer. The polymerization of styrene, unlike methyl methacrylate, may be carried out in a closed vessel. However, both materials undergo considerable amount of shrinkage while solidifying, and allowances must be made.

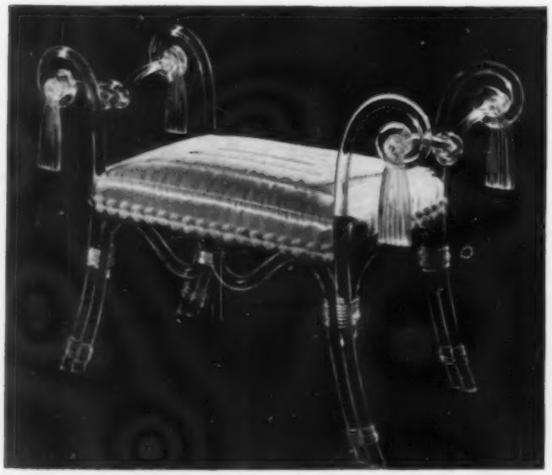


FIG. 4—Representative of fabricated shapes from polymethyl methacrylate is this vanity bench.

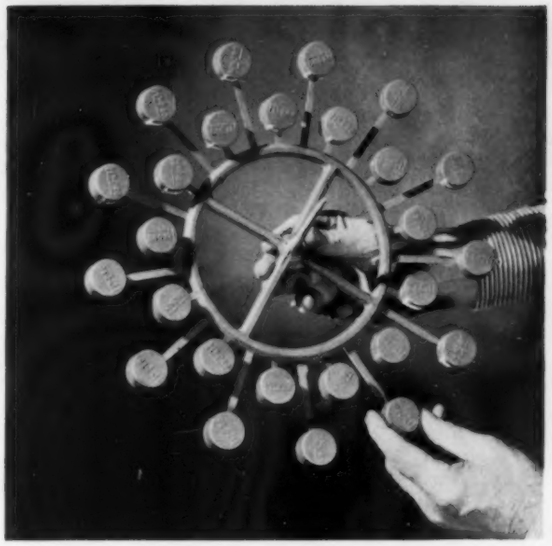


FIG. 5—Chemical bottle closures which have been injection molded of polystyrene.

In the plastics field among the best known commercial forms of polystyrene are molding materials. Injection molding of polystyrene is steadily increasing and there are striking examples in every field. For example, chemical bottle closures which have been injection molded of polystyrene are shown in Figure 5. Characteristic of thermoplastics, colors range from crystal clear to opaque varieties.

The crystal clear types are particularly well suited to electrical applications, possessing low power factor and low loss factor when operating at radio frequencies. The purest grades are then employed, as most filler additions or plasticizer additions decrease the desirable dielectric properties. Of course, temperature limitations should be recognized and the plastic not operated much above 150° F., particularly if it is under some mechanical stress.

Cellulose Derivatives

The first plastic materials ever to have been prepared were cellulose derivatives. Today they play a prominent role in thousands of industrial and artistic applications. Whereas synthetic resins are prepared from simple, primary reagents, cellulose derivatives use as raw materials the already polymerized cellulose obtained from cotton and wood sources. Most extensively employed in this industry are the short cotton linters, which are of little value to the textile trade. Among those cellulose derivatives which are of singular interest to the plastics field are:

Regenerated Cellulose	Methyl Cellulose
Cellulose Acetate	Cellulose Acetate-Butyrate
Cellulose Nitrate	Cellulose Acetate-Propionate
Ethyl Cellulose	

Nitrocellulose, better known as pyroxylin or celluloid, has been known for many years. It forms a

unique combination with camphor, which is compatible in all proportions. However, its high flammability led to the development of other cellulose esters and the cellulose ethers.

In analyzing properties of the cellulose plastic, one must turn to the basic concept of the cellulose molecule $(C_6H_{10}O_5)_n$, where it is observed that long chain molecules are formed from beta-glucose units (see Figure 6). These long chain molecules are associated together in groups of 50 to 100 members to form micelle units. The micelle units, roughly shown by X-ray to be 50 x 50 x 500 angstroms in size, are combined to form the microscopically visible fibrils and then the optically visible fibers.

When this nature-made molecule is entered into chemical reaction, the points of attack are the three hydroxyl groups associated with each beta-glucose member. Thus, for example, in nitrating cotton with concentrated sulfuric acid and nitric acid, the hydroxyl groups are replaced by nitrate groups.

Naturally, with a countless number of hydroxyls available, it is unlikely that full chemical reaction takes place unless conditions have been properly adjusted.

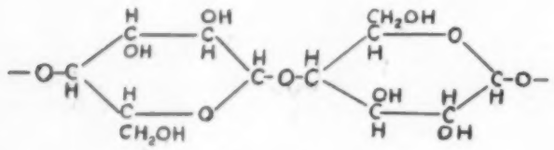


FIG. 6—Portion of cellulose molecule.

In fact, the purpose to which the nitrocellulose is to be put determines the degree of substitution or the degree of nitration. Thus, for example, the following table based on degree of substitution, shows various applications of cellulose nitrate:

Cellulose Nitrate

Product	*Nitrogen Content (%)*
Explosives	12.1 — 13.8
Lacquers	11.5 — 12.1
Plastics	10.5 — 11.5

Full, theoretical nitration in which all OH groups are replaced would be represented as follows:

$$(C_6H_7O_2(OH)_3)_x + 3XHONO_2 \rightleftarrows X(C_6H_7O_2(NO_2)_3) + 3XH_2O$$

In a somewhat similar manner acetylation of cotton takes place through reaction with acetic anhydride and glacial acetic acid, and cellulose acetate is prepared. Other cellulose esters of note are the mixed cellulose esters, cellulose acetate-butyrate and cellulose acetate-propionate. In this connection it is interesting to note the effect of larger side chains on the tensile strength of cellulose derivatives. In Figure 1 is shown the effect of the substituent groups on tensile strength of cellulose triester films (curves from Sheppard-Newsome—*J. Phys. Chem.*, Vol. 39, p. 143, 1935).

Commercially, however, control of physical and molding properties of cellulose derivatives is made possible through plasticizer additions. Thus there are various sheets, rods, and tubes of cellulose plastics which are cut or extruded from plasticized formulations containing substantial amounts of solvents. The

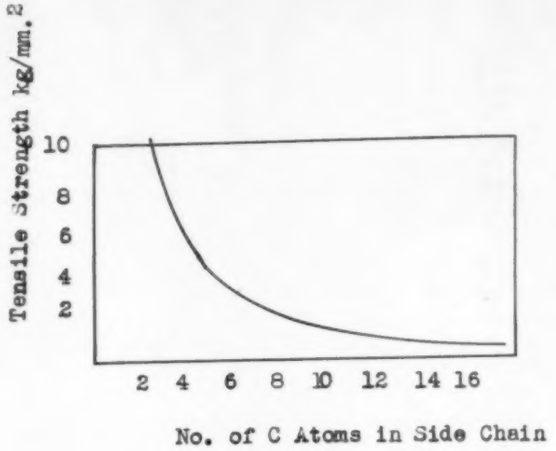


FIG. 7.

sheets and rods are then seasoned for a period of time, depending on thickness, and straightened and polished. Their appeal as a plastic material depends a great deal upon the kaleidoscopic assortment of colors and color combinations in which they are available, as well as their fabricating qualities.

Some of the industrial applications of cellulose ester derivatives are shown in the machined and fabricated tool handles (Figure 8) and the molded gas mask parts (Figure 9). Coated fabrics, lacquer formulations, adhesives, jewelry, advertising novelties, and motion picture film, are some of the many uses to which cellulose plastics are put.

The cellulose ethers (methyl and ethyl cellulose) have not to date enjoyed as wide a distribution as cellulose esters, though they exhibit much promise. In their preparation, cellulose is treated first with caustic soda to prepare sodium cellulose. This is reacted further with alkylating agents, such as ethyl chloride, to form cellulose ethers. The product is dissolved in alcohol and the cellulose derivative precipitated by water.

As for cellulose esters, the properties of ethyl cellulose are dependent upon the degree of etherification, and, in preparing plastics, that range with the lowest softening point is employed. Ethyl cellulose is especially compatible with various natural and synthetic resins, waxes and plasticizers. It is well known as an

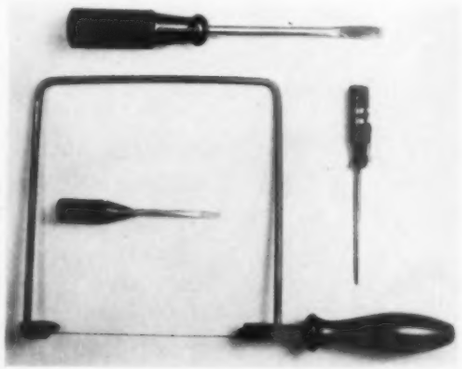


FIG. 8—Tool handles of cellulose plastics.

extruded material and as a transparent foil for electrical insulating and packaging purposes. Various grades are also suited to injection molding.

Methyl cellulose is unique among the plastics, because, in spite of its ether structure, it is soluble in water. As a thickening agent and component of paper coatings it is becoming well known.

Regenerated cellulose is a pure form of cellulose which is prepared into a liquid form as sodium cellulose xanthate and then reprecipitated into cellulose as a fine fiber (rayon) or thin sheeting (cellophane). The large annual consumption of regenerated cellulose products makes the production and use of this material almost a separate industry.

Miscellaneous Thermoplastics

Among the miscellaneous thermoplastic materials of note are coumarone-indene resins, polyamides, protein substances, and various rubber derivatives. Coumarone-indene resins obtained from solvent naphtha fractions are polymerized in presence of sulfuric acid. Commercially, they are available in numerous fractions of low, medium, and high melting point substances. The harder varieties are used in various plastic formulations, whereas softer grades are employed as softeners in rubber compounding to facilitate handling on rolls. They are also used in varnishes as substitutes for more expensive synthetic resins.

Polyamides, formed through interaction of diamines and dicarboxylic acids, are better known by their trade names of Nylon and Exton. With the recent embargo on silk we can expect textile manufacturers to turn to the polyamides, where they have already found a more than efficient substitute. The extruded materials

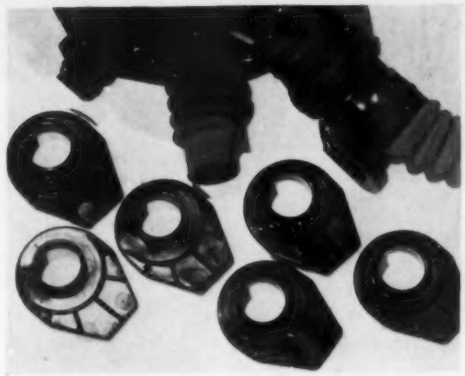


FIG. 9—Molded gas mask parts of cellulose acetate.

can be cold stretched to develop exceptionally high tensile strength.

Protein substances, such as zein, casein, and soya bean protein, have always been important to the plastics field. With the increasing consumption of synthetic resins we can expect that more and more use will be made of plastics whose origin lies essentially in farm by-products. Casein is of course used most extensively, though its most fruitful market is at present the button industry.

Rubber derivatives, such as chlorinated rubber and rubber hydrochloride, have taken their place as thermoplastic substances. Highly important in acid and alkali resisting paints are the chlorinated rubbers. Rubber hydrochloride on the other hand is very well known as a packaging material (Pliofilm).

New Cord for Automobile Tires

A NEW type of cord for automobile tires, designed to impart longer life to the tire, is described in two recently issued United States patents (Nos. 2,254,740 and 2,254,741), both of which have been assigned to the United States Rubber Co. of New York and the Hampton Co. of East Hampton, Mass.

Made from cotton fibers, the new tire cord is said not only to withstand the high temperatures generated in tires as they roll over highways, but also to possess improved flexibility and resistance to fatigue.

The process in preparing the cord is similar to that used in mercerizing cotton goods to give them a high, silky sheen. The cords are treated with caustic soda while kept under tension and stretched 5 per cent over their original length. After this treatment they are washed with warm water and dried.

The mercerization is said to "hydrate" the yarn. Unlike ordinary untreated cotton cords which lose as much as 30 to 40 per cent of their strength when becoming bone dry, the treated or "hydrated" cord retains its strength.

Untreated cotton cord in a tire breaks down, the inventors explain, because the heat generated in the tire drives out the 6 to 7 per cent of water which is normally present in ordinary cotton cords. This does not happen with the mercerized cotton cord, it is asserted. Moreover, the new tire cord strongly adheres to the rubber of the tire so that it remains firmly imbedded therein.

For greater resistance to abrasion, Madame should use HYCAR.

See page 435

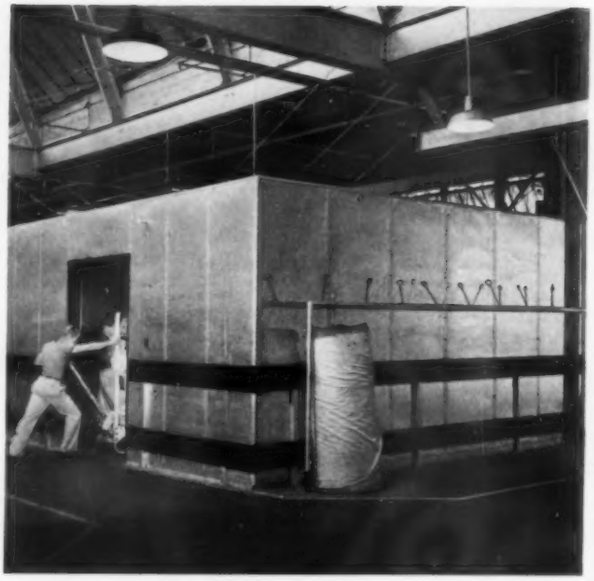
"Hanging" Roof Saves Floor Space In Firestone's New Huge Dry-Room

THE construction of a huge dry-room with an entirely clear floor area, unbroken by supporting columns, has been made possible by the use of a new prefabricated light steel structure. The structure, which is installed in the Los Angeles plant of the Firestone Tire and Rubber Company, has its roof suspended by tie rods attached to the overhead beams.

Built in Form of Rectangle

The room is built in the form of a rectangle, 70 feet long, 30 feet wide, and 10 feet high, and serves as a dry-room and storing room for rayon used in the manufacture of automobile tires. In order to utilize all possible floor area, it was necessary to eliminate the supporting columns that would ordinarily be required. For the light, rigid structure, it was found that the roof could be suspended from above.

The dry-room was built of the new Lindsay Structure, an all-steel type of construction in which sheet metal panels are held in tension between framing members. This patented construction provides additional strength, so that light framing can be used without any crossbraces, gussets, or struts. It is also almost completely air-tight and has the added advantage of requiring only about five days to erect.



Exterior view of the Lindsay Structure dry-chamber built for Firestone's Los Angeles plant. Note how tie-rods attached to beams support the roof.

Interior of the dry-chamber showing the air conditioning unit and insulation. Note the open floor space and absence of any supporting columns.

The total weight of the Firestone dry-room, not including insulation or doors, is only 11,189 pounds, or approximately 5.3 lbs. per sq. ft. of floor area. The interior is lined completely with ½ inch of rigid type insulation. The temperature of the dry-room is held at 90 degrees with a maximum variation of only one degree. Relative humidity is maintained at 30% or less by cooling coils which extract the moisture from the air before it is reheated.

The entire system delivers 4000 cfm through the heating and cooling coils and is powered by a 5-hp Carrier compressor. The complete insulation of the room and cooling system was engineered by the Gay Engineering Company of Los Angeles.

Heat Losses Kept at Minimum

An interesting feature of the dry-room is "push button" control of the doors to keep heat losses at a minimum. The doors at each end of the room are opened and closed by the drivers of the trucks which carry the rayon in and out. As the trucks pass the push button control station the doors are operated by the drivers without leaving the vehicles. Consequently, the doors are kept open only when absolutely necessary to allow the passage of the trucks.

X-Ray Studies of Rubber

Part IV—Finely Divided Crystalline Fillers

By GEORGE L. CLARK
Professor of Chemistry
and
ROBERT L. LeTOURNEAU
University of Illinois, Urbana, Illinois

This fourth article in the series of x-ray studies of rubber discusses x-ray diffraction patterns of several fillers, obtained both from powder samples of these materials and also from rubber mixes containing them. It provides an excellent correlation of scientific fact with commercial compounding results. Part I of this series appeared in the February, 1941, issue of "Rubber Age," Part II in the April, 1941, issue and Part III in the July, 1941, issue. The series is being reproduced through the courtesy of the R. T. Vanderbilt Co., for whom the studies are being made.—Editor.

SINCE finely powdered crystalline inorganic fillers are now so commonly used in commercial vulcanized rubber for various purposes, we now turn to a consideration of the information on these fillers which may be obtained by the x-ray diffraction method.

(1) *Rubber Age (N.Y.)*, February, 1941.

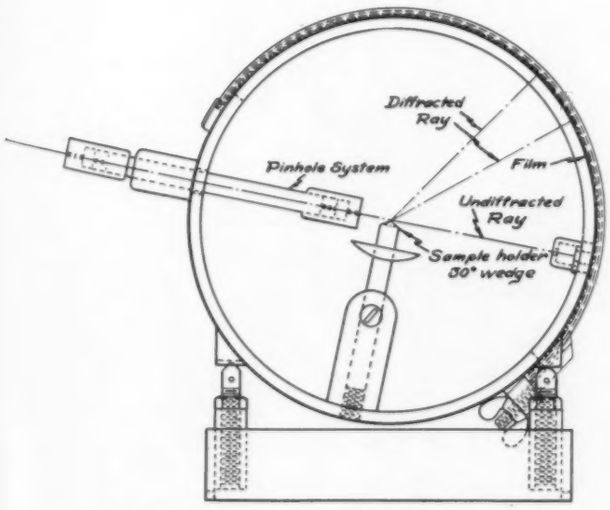
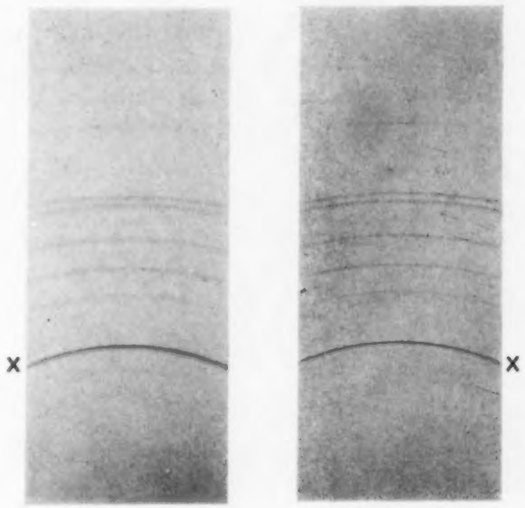


Figure 1. Diagram of cylindrical camera.



Kalvan *Gilder's Whiting*

Figure 2. X-ray diffraction patterns of Kalvan and Gilder's whiting in powder form. Cylindrical camera used.

Every x-ray pattern of vulcanized rubber compounded with fillers displays, in addition to the halo for unstretched rubber and diffraction spots for stretched rubber, diffraction rings corresponding to the various fillers in the rubber. These rings constitute the "fingerprints" by which each crystalline substance may be uniquely identified and from which its ultimate architectural plan may be deduced. In Part I *(1)* of this series it was shown how a crystal such as calcite is built "on a lattice work which is characteristic of the crystal as a fingerprint is characteristic of each human being"; and how "this plan of building is deduced from the crystal spectrum." By means of our x-ray diffraction patterns we are able to determine not only the identity and crystalline structure of each filler but also when compounded in rubber, both the effect of the filler on the rubber and the effect of the rubber on the filler, particularly during stretching. In addition, it is possible by the x-ray technique to say something about the grain size and shape of powdered crystalline ma-

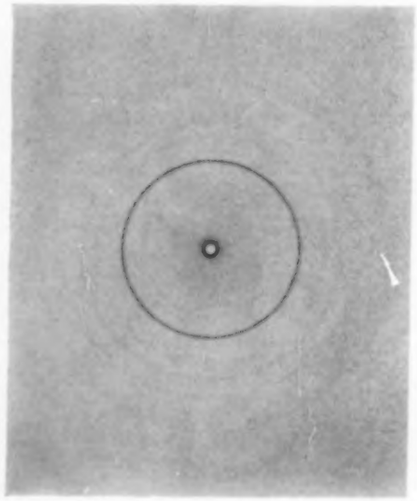
terials, into which class the ordinary rubber fillers, with the possible exception of carbon black, fall.

Our discussion then will take the following course: *First,* standard patterns of Kalvan and Gilder's whiting will be used to identify and compare the crystalline structures; in addition standard patterns of zinc oxide and red iron oxide which also are involved in the compounds containing the Kalvan or whiting permit identification of each diffraction interference when two or three of these powders are present simultaneously in one rubber specimen. *Second,* a comparison of the grain sizes of Kalvan and Gilder's whiting will be made by the x-ray method. *Third,* the effect of the rubber on the filler, manifest by the orientation of the filler particles in the rubber matrix, will be compared for these two fillers and the results correlated with tear resistance of the two rubber-filler systems. *Fourth,* the effect of the filler on the pattern of stretched rubber will be considered.

1. "Fingerprint" Patterns of Filler Powders

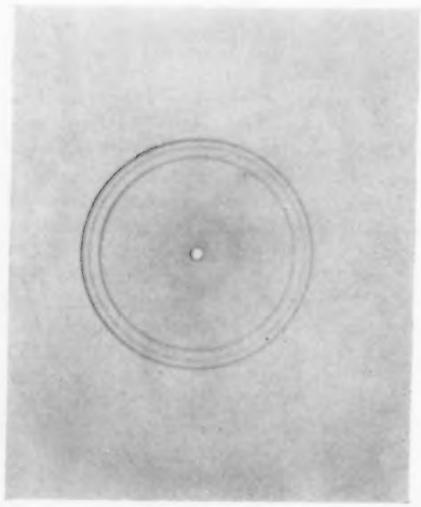
The diffraction technique described in the previous parts of the series has applied especially to rubber specimens. It employs a flat film at a fixed distance from the specimen as illustrated in Figures 3 and 4 of Part I. When a powder specimen is to be analyzed it is often convenient to produce the diffraction lines on a narrow film, something like an ordinary optical spectrum. For this purpose a cylindrical camera is used with the narrow film bent around the circumference at a constant radius from the specimen at the center of the camera. The powder is held in a cradle-like holder in the form of a wedge, through the narrow edge of which the x-ray beam, defined by pinholes, passes. Figure 1 illustrates diagrammatically the construction of one of the cameras which were designed, and have long been used successfully, in this laboratory.

In Figure 2 are reproduced the "powder" patterns

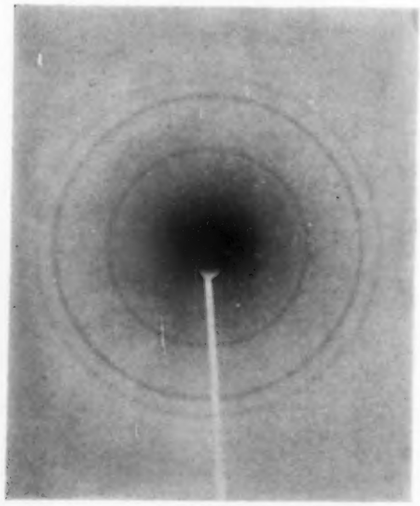


A. Kalvan

B. Gilder's Whiting

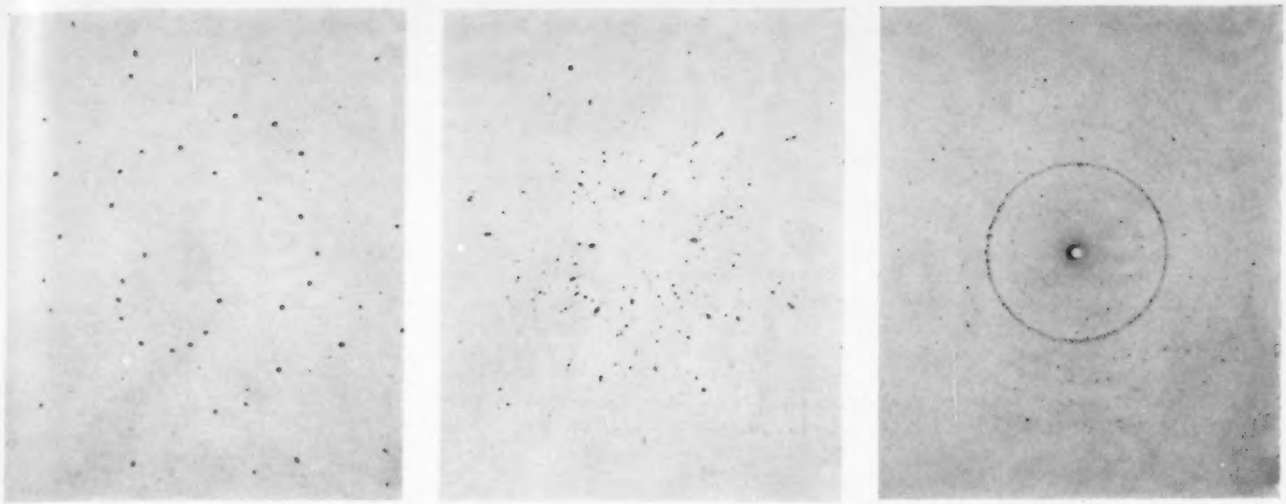


C. Zinc Oxide



D. Red Iron Oxide

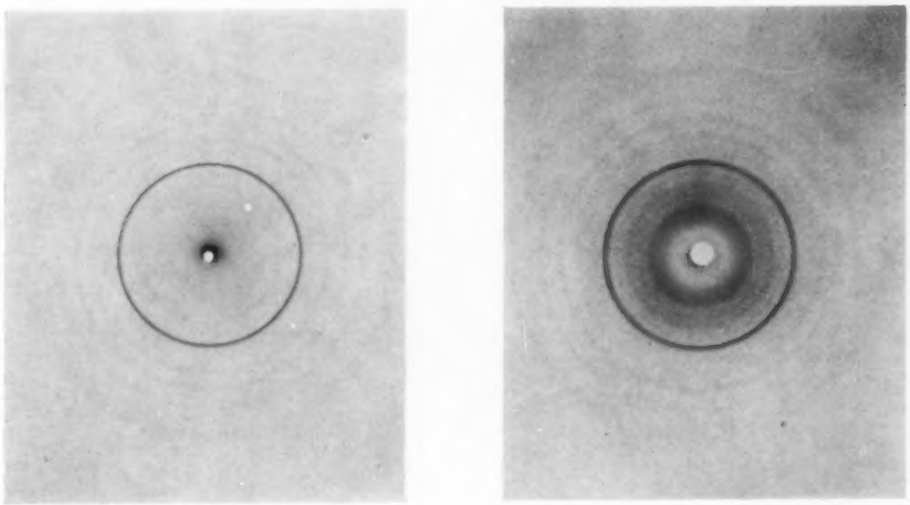
Figure 3. X-ray diffraction patterns of Kalvan, Gilder's whiting, zinc oxide and red iron oxide in powder form. Flat films used.



A. Pattern of a single calcite crystal

B. Original crystal broken up into a large number of small crystals

C. Crystals have been made so small that their orientation is random



D. Particle size almost colloidal

E. Particle size colloidal

Figure 4. X-ray diffraction patterns of calcite showing effect of decreasing particle size.

obtained by this technique for Kalvan and for Gilder's whiting, from which it is at once apparent that the positions and relative intensities of the lines in the two patterns are identical. Furthermore these positions and intensities are the same as for a known pure sample of powdered calcite, $CaCO_3$. The *breadths* of the corresponding lines, however, are not identical, as will be discussed later. Hence it is at once concluded that the internal structure of both Gilder's whiting and Kalvan is identical with that of powdered calcite—one of the crystal forms of calcium carbonate. (Aragonite, another variety, produces an entirely different pattern.) A further conclusion is that differences in behavior of whiting and Kalvan in rubber compounds must reside, not in differences in ultimate crystal structure, but in differences in grain texture—such as grain size, shape and surface condition.

In Figure 3 are arranged patterns, made on flat films exactly as for rubber specimens, for Kalvan, Gilder's whiting, zinc oxide and red iron (ferric) oxide. The latter two are present in certain of the rubber compounds described later containing either one or the other of the calcite fillers. Zinc oxide activates the accelerator during vulcanization, and part of it remains as a separate solid phase in the same sense as a chemically inert filler. Since each ring on the pattern is to be identified with one set of crystal planes, we may say that for hexagonal zinc oxide the planar indices of the lines reading from the inside of the pattern toward the outer edge are: (100), (002), (101), (102) and (110). Red iron oxide is added simply as a coloring pigment and supposedly is otherwise inert.

In compounding some of the commonest commercial rubber stocks these three inorganic crystalline powders —calcium carbonate, zinc oxide and iron oxide—are added; therefore, on an x-ray pattern of such a specimen, lines for all three may be identified, proving that the grains have not dissolved, nor reacted with each

other to form any new chemical individual. Any diffraction lines or rings, which do not correspond with these standard patterns, must belong to an entirely different filler, such, for example, as clay or titanium dioxide. Carbon black, because it is essentially noncrystalline, may display only one or two broad rings corresponding to strong lines of crystalline graphite.

2. Particle Size Measurement

Figure 4 illustrates remarkably well for calcite the effect of grain (or particle) size on an x-ray diffraction pattern obtained with unfiltered polychromatic radiation. Part A is a Laue pattern of a single calcite crystal, characterized by a relatively small number of sharp spots, definitely placed, which correspond to the rhombohedral symmetry of the crystal. Part B is a pattern of this same calcite crystal broken up into a large number of small crystals. For this specimen we observe a peppering of spots on the film, which amounts to a whole series of Laue patterns, taken from crystals at different angles to the x-ray beam and superimposed upon each other on the same film. In part C the crystals have been made so small that their orientation in the sample is random and the many spots begin to fuse together to make Debye-Scherrer rings. At this point the average grain size is just a little larger than 10^{-3} cm. in diameter. In the range between 10^{-3} and 10^{-6} cm. the sharp diffraction rings shown in part D are obtained. If the powder is now divided still finer the particle size enters the colloidal range below 10^{-6} cm.; the diffraction rings broaden into halos as shown in part E of the illustration.

Figure 3 shows diffraction patterns of samples of Kalvan and Gilder's whiting. On comparison with Figure 4 it will be noted that the Gilder's whiting pattern seems to lie somewhere between C and D. This indicates a rather wide distribution of particle sizes with limits perhaps as wide as 10^{-3} to 10^{-6} cm. The pattern of Kalvan on comparison with Figure 4 would lie somewhere between D and E. The particle size of the Kalvan is too close to the 10^{-6} cm. limit to permit a highly accurate evaluation of the particle size. But at the same time, the Kalvan lines are sufficiently broader than the narrow lines of the Gilder's whiting to make possible an estimation of the particle size based on the Scherrer equation, which permits calculation of colloidal particle size from measurement of the broadening of the diffraction interferences. This equation, which has been thoroughly tested and successfully used, is as follows:

$$D = 0.94 \frac{\lambda}{(B' - b')} \cdot \frac{1}{\cos(\chi/2)}, \text{ where}$$

D = the edge length in Ångstrom units of the crystal considered as cube — or particle size;

λ = the wavelength in Ångstrom units of the radiation used;

B' = the measured breadth in radians at points of half maximum intensity of the Debye-Scherrer diffraction line, or

$B' = B/R$, where B is the width in millimeters and R the radius of the camera (in this case 50 mm.);

b' = the minimum possible breadth of the line, similarly measured, which is a constant depending upon the particular apparatus and size and absorption of the specimen;

χ = the angle of diffraction, *i.e.* twice the Bragg angle.

For making these measurements we use the powder patterns of both Kalvan and Gilder's whiting taken on the circular camera with a wedge sample, as shown in Figure 2. Clark and Rhodes *(2)* have shown that the particle size equations may be applied to patterns for samples of wedge shape taken on the cylindrical type of camera commonly used at the University of Illinois *(3)*. The source of radiation for these patterns was a Phillips-Metalix copper target tube, operated at 25 ma. and 30 kvp. Identical exposures were made to radiation filtered through nickel foil. The breadth of the brightest lines, marked with a cross (x) on the patterns and corresponding to the (100) interference, were measured using the new Leeds and Northrup recording microphotometer (Figure 5). Careful tests proved that the lines for Gilder's whiting were the narrowest obtainable for any powder for the given apparatus. Hence, the half-maximum breadth of the Gilder's whiting line was used for the b' in the above equation. Its width was 0.190 mm. and that of the same line for Kalvan was 0.446 mm. Substitution in the Sherrer equation gave a value of about 300 A.U. or 0.03 microns for the particle size of the Kalvan. This compares very favorably with a value based on electron microscope measurements of 300-800 A.U. (reported to us by private communication).

The x-ray measurement depending on line broadening obviously favors the smaller particles present in a distribution of sizes. This means, then, that each minute crystal grain is built up of something like 30 unit

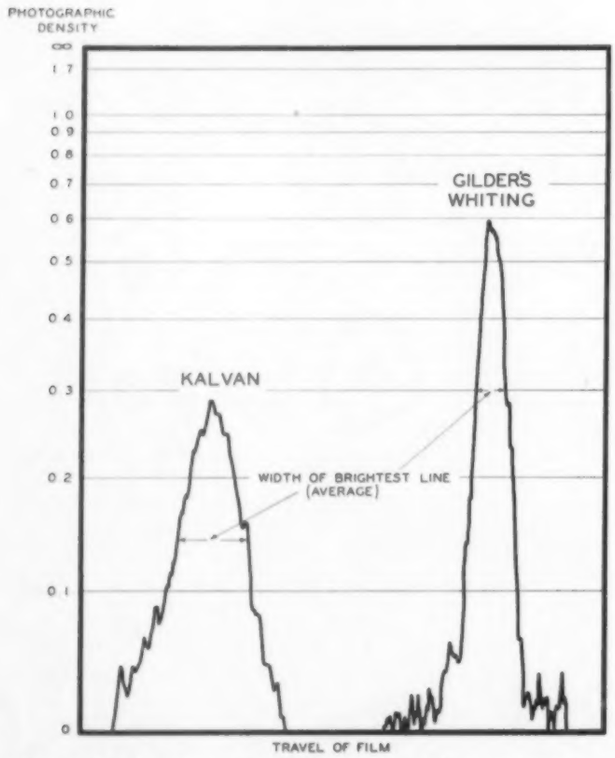


Figure 5. Microphotometer tracing for use in particle size determinations.

(2) *Rub. Chem. & Tech.*, Vol. 13, p. 655 (1940).
(3) Clark, "Applied X-Rays," p. 269.

crystal cells along an edge. The smallest average particles of Gilder's whiting, on the other hand, are of the order of *10 to 100 times* larger than those of Kalvan. Or for a given weight, Kalvan has 10 to 100 times as great an active surface for bonding to the rubber matrix. This would be expected to exert a considerable influence on the behavior of the filler in rubber during deformation, and hence on the physical properties of the rubber mix.

3. The Rubber-Filler System

In the table are listed the stocks subjected to x-ray analysis in the comparison of the effects of Gilder's whiting and Kalvan. Compounds C and E contain Kalvan, but in much smaller proportion than recommended commercially. A common commercial proportion, about 75 per cent by weight on the rubber, absorbs so much of the x-ray energy that with this proportion it is difficult to reproduce clearly the rubber interferences. Therefore because of the necessity in this x-ray work for the use of abnormally low loadings of Kalvan the usual tensile and tear resistance properties of the stocks are omitted. The low loadings give perfectly satisfactory x-ray data—indeed more satisfactory data than do the higher loadings—but no outstanding tensile and tear resistance is imparted except with high loadings.

In Figure 6 a few of the typical patterns are reproduced as follows:

Compound A. A dry film from latex, stretched 550%. This is to show the pattern for rubber free from all fillers, and is familiar from description in Part I.

Compound B. No calcite filler or red oxide, stretched 550%. Here all the rings present in addition to the rubber interferences are due to zinc oxide. It is interesting that these rings are not uniformly intense as they are for the zinc oxide in Figure 3, but appear with localized intensity maxima. This means that during stretching of the rubber, the imbedded zinc oxide grains are rotated and lined up in a preferred direction with respect to the direction of stretching. It is possible to calculate from the positions of the maxima on the rings the actual arrangement, with the normal to the (001) planes parallel to the fiber or stretching axis. This means in turn that such a powerful bond exists between the zinc oxide grains and the rubber that the rubber does not tear away from the oxide surfaces during stretching but instead tends to pull all the grains into parallel alignment. This is distinctly a property of the zinc oxide, and to some extent of the compounding, for in the course of years of investigation many specimens containing 5 parts of zinc oxide showed no such fibering of these crystal grains whatever at 550% elongation.

Compound C. Contains 25 parts of Kalvan: stretched 200%, the central rubber halo shows no evidence at this elongation of crystalline spots. The very intense ring is characteristic of calcite (Kalvan) and all others may be identified by comparison with Figure 3 as belonging either to calcite or zinc oxide.

The rings are continuously uniform, indicating random arrangement of all crystal grains.

Compound C. Stretched 550%. Now the crystal fiber pattern for rubber has appeared, and in addition the Kalvan lines, especially the faint line just outside the rubber interferences and the very intense ring,

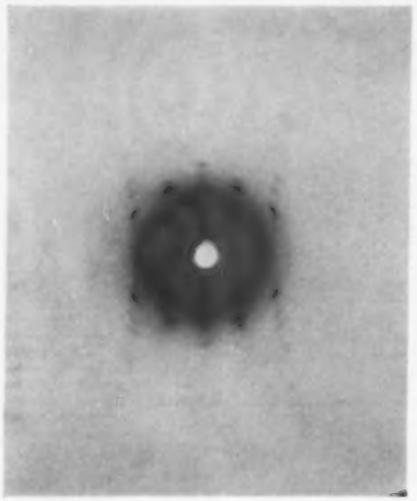
	A	B	C	D	E
Rubber from Latex.	100	—	—	—	—
Smoked Sheet	—	100	100	100	100
Reogen	—	1	1	1	1
AgeRite Resin D...	—	1	1	1	1
Stearic Acid	—	1	1	1	1
Sulfur	—	0.6	0.6	0.6	0.6
Altax	—	1.5	1.5	1.5	1.5
Tuads	—	0.25	0.25	0.25	0.25
Telloy	—	0.25	0.25	0.25	0.25
Zinc Oxide	—	5	5	5	5
Red Iron Oxide	—	—	—	—	5
Kalvan	—	—	25	—	25
Gilder's Whiting ...	—	—	—	25	—
Press Cure at 287°F.	Uncured	20 Min.	20 Min.	20 Min.	20 Min.

show *definite evidence of fibering,* even more pronounced than that of zinc oxide. Again this means a remarkably powerful bond between Kalvan particles and rubber, and a sufficiently small size so that the grains rotate and align themselves with respect to the direction of stretch, and *just as reversibly* as the rubber itself crystallizes; for on release of tension the specimen again reverts to an entirely random arrangement of rubber molecules and filler crystals. Fibering of the filler appears just when fiber spots appear for the rubber.

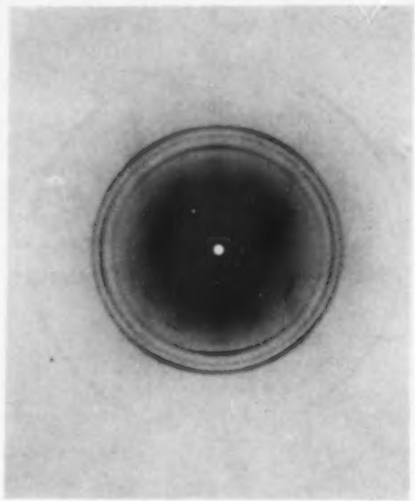
Compound D. Contains 25 parts of Gilder's whiting: stretched 550%, under these identical conditions, the contrast with the preceding pattern is remarkable. The rubber crystallizes at this elongation, but the whiting crystal grains are *entirely unaffected* by the stretching operation and remain in the original random arrangement. The grains are too large, and the bond with rubber too weak to permit a response to stretching deformation; the rubber must tear loose and in a sense flow around and past these particles like water in a stream around fixed boulders; or an exaggerated case is the same effect of rubber containing grains of sand. Stretching to breakage at about 700% elongation has no greater effect on the whiting grains.

Compound E. This specimen contains 25 parts of Kalvan and also 5 parts of red oxide, stretched 675%. It again demonstrates the marked fibering of the Kalvan grains. Exactly the same phenomenon is shown for any specimen containing Kalvan, from 5 to 75 parts. With 75 parts of Kalvan as a common commercial proportion, the fibering is very prominent, but as previously stated on account of the preponderance of the mineral crystals which absorb much of the x-ray energy, it is difficult to reproduce clearly the rubber interferences. Especially noteworthy is the enormous increase in tear resistance in increasing the Kalvan content from 25 to 75 parts. This is but another indication of the great capacity of the rubber to bond itself to Kalvan particles. In the stretched condition it might be expected that the resistance to tear *across* the fibers will be greater than parallel to them, just as it is easier to split asbestos fibers apart parallel to their length than to break a bundle across the fibers.

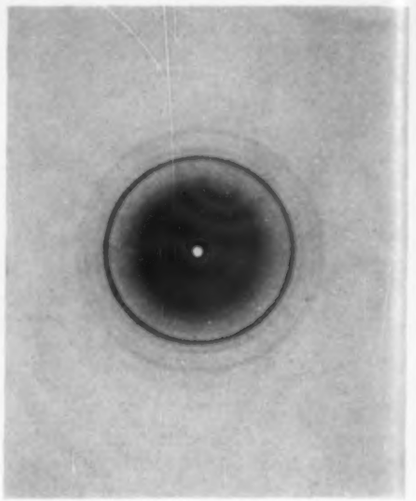
The foregoing statements have referred to the effects of rubber on the filler, and now it is appropriate to ask what are the effects of the filler on the ability of the rubber to "crystallize" on stretching. It has been observed frequently in this laboratory and by



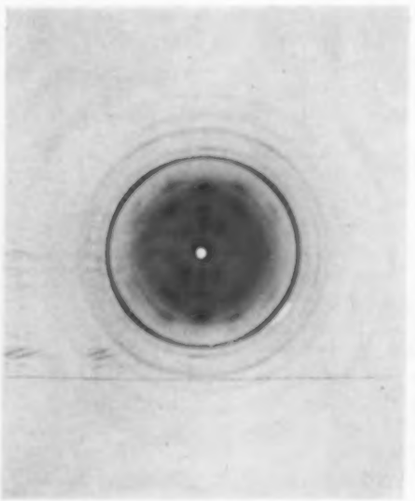
Compound A. Stretched 550 per cent



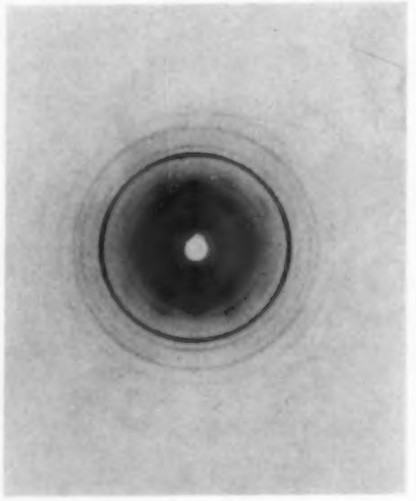
Compound B. Stretched 550 per cent



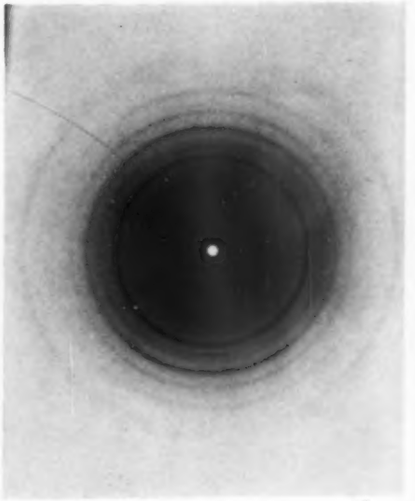
Compound C. Stretched 200 per cent



Compound C. Stretched 550 per cent



Compound D. Stretched 550 per cent



Compound E. Stretched 675 per cent

Figure 6. X-ray diffraction patterns of rubber compounds.

others, including Gehman and Field, that some, but not all, carbon blacks lower the percentage elongation at which the rubber fiber pattern appears to a value (say 150%) considerably below that for the basic vulcanized stock. It has already been noted that with Kalvan stock no fibering is evident at 200% elongation. But even if the effect is not so marked as with highly active amorphous carbon blacks, the rubber fiber pattern does appear somewhat sooner with Kalvan present than without it. Gilder's whiting seems to have no effect. Extended data on crystallization hysteresis loops, such as described in Part III, need not be presented since they appear as expected and not greatly different from the basic stock with the exception that the Kalvan loop undoubtedly lies above the whiting loop, indicating a higher degree of parallel alignment of rubber molecules for the former specimen at a given elongation.

Another significant observation is that *retraction is much more uniform* over the whole length of the specimen in the presence of Kalvan than without it. The retraction curve of the loop has no "bumps" or irregularities (see Part III) *(4)* produced by irregular localized contraction, so that the filler has the power of distributing stress remarkably uniformly throughout the specimen. Finally, it may be noticed that the rubber fiber interferences for stretched specimens containing filler appear as slightly longer arcs than the sharp spots for stretched latex, but do not differ measurably from the condition of the basic stock containing only zinc oxide. This same effect to a more marked degree has been observed in carbon black stocks and may be ascribed to the curving of parallel molecules around the individual particles. For all the Kalvan

(4) *Rubber Age, (N.Y.)*, July, 1941.

stocks also we have noted that these rubber interferences are narrower than for other specimens. The significance of this will have to be investigated further; but in terms of the particle size equation it can mean only that the individual crystallized areas in the stretched rubber are somewhat larger than usual, as though Kalvan were constraining the rubber molecules into a parallel alignment over a greater proportion of their length. In terms of the preferred theory of rubber structure presented in Part II *(5)*, the fringe-like areas of disorientation, while providing pliability, are points of potential physical and chemical weakness. The role of Kalvan in improving physical properties could thus be explained, not only for its own contribution but for its influence on the size of crystallization zones in the rubber itself.

Summary

1. The use of x-ray powder diffraction patterns as "fingerprints" for identifying any crystalline substance has been illustrated for Kalvan, Gilder's whiting, zinc oxide and red iron oxide, all of which appear in the vulcanized rubber stocks under investigation. The first two give patterns identical with that of pure calcite, one of the crystal forms of calcium carbonate.

2. The determination of colloidal particle size from x-ray patterns is described and a value of 300 A.U. (0.03 microns) obtained for Kalvan, in agreement with some measurements with the electron microscope. The equations are found not to apply to Gilder's whiting whose particles are about 100 times larger than those of Kalvan.

3. Kalvan particles are found to take up parallel alignment (like the grains in an asbestos fiber, for example) in the rubber matrix when stocks containing this filler are stretched, while Gilder's whiting displays no such tendency and remains with grains oriented at random even at highest elongations. It is suggested that this fibering tendency is a measure not only of particle size, but also of the bonding between the inorganic filler crystals and rubber.

4. Observations from x-ray patterns are given on the effect of the filler on the behavior of the rubber itself on stretching, which indicate a more profound influence than expected and give a reasonable explanation to enhanced physical properties. Incidentally these studies indicate that red oxide, added only as a coloring pigment, is not wholly inert in its effect on other constituents of the stock. This will receive further investigation.

(5) *Rubber Age, (N.Y.)*, April, 1941.

Rules on Priorities Orders and Actions

A SERIES of broad rules and regulations which will apply to priorities orders and actions was issued on August 28 in a new basic document—Priorities Regulation No. 1—issued by the Director of Priorities of the Office of Production Management.

Most important provision of the regulation is that which requires all manufacturers and producers to accept defense orders (subject to a few specific limitations) even if acceptance of these orders will prevent, or delay, deliveries on non-defense orders or defense orders with lower preference ratings.

Defense orders are defined and a requirement that defense orders be accepted is set forth in a six-point formula. This formula is similar to that which appeared for the first time in the pig iron priority order, but it is now provided that the requirement applies to all manufacturers, producers, distributors and dealers, in whatever category.

Since the new regulation lays down a general framework for priorities compliance, future orders issued by the Division will merely cite Regulation No. 1 and will not repeat the full text of the requirements. However, the specific provisions of any existing or future order issued by the Director of Priorities will control when in conflict with the general provisions of Regulation No. 1. In the absence of such a conflict, Regulation No. 1 will always be applicable to any priorities order.

The following is an informal summary of major provisions of the new regulation:

(1) The regulation provides a system under which any defense customer for any material, who is unable to place his order satisfactorily, or whose delivery is delayed, may bring this matter formally before the Director of Priorities who will take appropriate action.

(2) The Director may assign preference ratings to orders which have been placed or which have not been placed, and he may also issue binding instructions regarding deliveries, without assigning preference ratings.

(3) Any person who has defense orders on hand must so schedule his production that deliveries under defense orders will be made on the dates required.

(4) Delivery dates specified in defense orders must not be earlier than required.

(5) Any allocations of material ordered by the Director may be made without regard to preference ratings which may have been assigned to deliveries under particular contracts or purchases, and in such cases specific allocations will take precedence over individual preference rating certificates or blanket ratings.

(6) Intra-company deliveries, except when otherwise specified, are to be subject to the same restrictions which may apply to inter-company deliveries.

(7) Accumulation of excess inventories is prohibited.

(8) All records required to be kept by priority orders are to be open to audit and inspection by representatives of OPM.

(9) Any person making wilful false statements may be deprived of deliveries of material; in cases where such action is warranted, the Director may also recommend prosecution under section 35 of the Criminal Code (18 U. S. C. 80).

NUMBER **TWO** OF A SERIES OF ARTICLES ON

Better Management for the Rubber Factory

II—OVERHEAD

By ARTHUR ROBERTS

WHILE making research studies in connection with our survey and better business management articles prepared for RUBBER AGE, we reviewed the operating figures of two rubber factories in the same eastern territory, which will serve as exceptionally fine "guinea pigs" in providing other managements in this industry with an angle on overhead expense that is given little or no consideration by rubber factory executives, mainly because the subject is never reviewed thoroughly.

Commentators usually content themselves with giving advice anent the dangers of letting overhead run wild but seldom, if ever, dissect it for interested parties to show that overhead or burden has a dual character, one part varying from the other as markedly as Dr. Jekyll differs from Mr. Hyde.

The case histories described here are based upon factual study, but inasmuch as the figures were reviewed in confidence, we cannot reveal the names; so let's call one plant, Jones Rubber Company, the other plant, Smith Rubber Company.

We doubt if two more fitting specimens for study of this important subject have been autopsied in the literature of this industry and it has been our privilege and fortune to come upon them at a time when overhead expenses are rising fast and when Congress has been asked to put a ceiling on prices without making provision for control of wages, two factors that will squeeze margin from each end so that spread is kept within a narrow area. At this crucial time, it behooves all rubber factory managements to understand their overhead from Alpha to Omega.

Importance of Overhead Expense

The two plants reviewed had similar operating set-ups and production costs, they bought their processing supplies from the same sources at similar prices; yet, their profits showed surprising contrast, and it wasn't because one management did a better job of sales promotion or gave more value for the money. These managements were about "Even Steven" on business ability, sales volume and equipment, they watched production closely but they gave too little attention to overhead expense, which encompasses indirect production costs or factory burden and commercial and administrative expense.

Because these two organizations, so much alike, earned net profits so dissimilar, they were studied to provide practical data for other rubber factories, particularly the small and moderately sized, who are quick to stymie all suggestions anent better business management with, "Give us the facts, brother!" Well, here *are* the facts, which many in this industry will find highly illuminating. To provide for easy reading and to eliminate the possibility of identification through the use of the exact figures, with the resulting criticism it would bring to us, we use round figures, eliminate cents but maintain ratios "as is."

Sales Records of the Companies

In 1939, the Jones Rubber Company did $968,000 in sales. The Smith Rubber Company volumed $972,800 in the same year. Their direct production costs and overhead for this year were about the same, so their net profits varied only $240 in favor of the Smith plant. In 1940, strikes in the territory hurt local sales and Jones' volume tumbled to $806,400, while Smith's sales dropped to $811,200. Again these factories were running neck-to-neck on sales for the year. In 1939, Smith's net profit was $240 more than Jones'. In 1940, when they again experienced similar sales volumes, the net profit at the Jones Rubber Company was $51,648, the net profit at the Smith Rubber Company was $18,192, giving the Jones' plant an increase of $33,456.

Such similarity in operating figures in the same territory where wages and operating supplies sell at similar price levels isn't so unusual to be "one for Ripley," neither is a wide variation in net profit between rubber factories with almost identical set-ups. Seldom, however, are the facts collated into one monograph, as in this case, because the opportunity to make comparative studies does not present itself. Nevertheless, the fact that the Jones Rubber Company ran so far ahead of the Smith Rubber Company on profits in 1940, although both plants had practically the same sales volume, brings up an important phase of expense control that all rubber manufacturers should watch hawk-eyed today; otherwise, it may play havoc with their most effective efforts to manage the business

efficiently and lead to that dreaded over-expansion with its inevitable unpleasant aftermath.

The "joker" lies in the ratio of fixed to variable overhead expense. Many rubber factory managements think that an expense is an expense, and although this is correct insofar as the dollar-for-dollar obligation is concerned, there is a big difference between a *fixed* expense and a *variable* expense in its effect on profits when sales begin to travel along a lower level. Thus, a high ratio of fixed expense may make it impossible for the management of a rubber factory to show a satisfactory profit regardless of the efficient operation of their vulcanizing presses, precision control equipment, mixing mills, extruders, rubber sheeters or the quality of rubber goods turned out.

The following comparative statements show with X-ray clarity that the ratio of fixed to variable overhead expense is of paramount importance today:

Both rubber factory managements cut their variable expenses 30 per cent, indicating that they were equally efficient with the nippers but the Jones' ratio of variable to fixed expense enabled the management to use expense control more effectively. The variable expenses at the Smith plant were too low in proportion to the total. Even though this management cut close, their efforts were stymied by the high ratio of fixed expense, which they couldn't cut—$226,880 of fixed expense against $113,440 of variable expense.

On the other hand, the Jones organization, with a bigger field to work in, $225,760 in variable expense against $113,440 for the Smith plant, took a grand slam at this portion of their overhead in 1940 and saved $67,728. They may have been able to effect some of this economy in 1939 if their minds had been on this phase of business management but, like many rubber factory managements, they forget their

Smith Rubber Company — 1939	
Sales	$972,800
Direct production costs	583,680
Margin on sales	$389,120
Overhead expenses	
Fixed expense	$226,880 (2)
Variable expense	113,440 (1)
Total overhead expense	340,320
Net Profit on 1939 Sales	$48,800

Smith Rubber Company — 1940	
Sales	$811,200
Direct production costs	486,720
Margin on sales	$324,480
Overhead expenses	
Fixed expense	$226,880
Variable expense	79,408
Total overhead expense	$306,288
Net Profit on 1940 Sales	$18,192

Jones Rubber Company — 1939	
Sales	$968,000
Direct production costs	580,800
Margin on sales	$387,200
Overhead expenses	
Fixed expense	$112,880 (1)
Variable expense	225,760 (2)
Total overhead expense	$338,640
Net Profit on 1939 Sales	$48,560

Jones Rubber Company — 1940	
Sales	$806,400
Direct production costs	483,840
Margin on sales	$322,560
Overhead expenses	
Fixed expense	$112,880
Variable expense	158,032
Total overhead expense	$270,912
Net Profit on 1940 Sales	$51,648

Notice that in 1939, the Smith Rubber Company's ratio of *fixed* to *variable* expense was 2 to 1, or their *fixed* expenses were twice as many dollars as their *variable* expenses, whereas the ratio of the Jones Rubber Company was just the opposite. Their *variable* expenses were twice their *fixed* expenses, or a variable ratio of 2 to 1. In 1940, the Jones and the Smith managements, sensing the downward trend in sales, began to reduce overhead to keep net profits in the right groove. Their fixed expenses were constant and could not be reduced so they had to concentrate on variable expenses, to wit:

Smith Rubber Company	
Total Overhead Expense 1939	$340,320
Total Overhead Expense 1940	$306,288
Decrease — 30% of $113,440 Variable Expense	— $ 34,032

Jones Rubber Company	
Total Overhead Expense 1939	$338,640
Total Overhead Expense 1940	$270,912
Decrease — 30% of $225,760 Variable Expense	— $ 67,728

overhead in the years of fat and try to economize only in lean years.

In these lush days, even though much volume is begotten synthetically, it is well to remember that you have an overhead and therefore never let your fixed expense loom so high in ratio to variable expense that you can't effect satisfactory economies when sales take the low road. We have known cases where the ratio of fixed to variable expense ran 8 to 1 without serious effect when sales were in high but when sales tumbled a wipe-out of the entire variable expense, all the reduction it was possible to make, would not prevent an operating loss.

Undue expansion will sometimes skyrocket fixed expenses haphazardly and explains why some manufacturers are none too keen these days about expanding because the fixed charges that expansion brings with it, cannot be discarded when sales tailspin from pinnacle to normal. This holds true for all business enterprises. If you load up too heavily with fixed expenses when sales skyrocket, you may not be able to get out from under when business resumes a normal trend or dips below normal.

This does not mean that you should throttle reasonable expansion but consider all circumstances carefully before obligating yourself to carry fixed expenses of substantial size that you can't cut at will, because they cannot be discarded as readily as variable expenses. This analysis is an eloquent warning to rubber factory managements to handle their overhead with care.

There is no standard ratio against which to check the proportion of fixed to variable expense. In the rubber industry, our studies show that the fixed to variable ratio gyrates from 1 to 2 to 1 to 5. The reader will naturally ask, "If the ratio varies rather inconsistently with sales and profits, what policy shall we pursue in keeping a check on this important factor in expense control?" We would suggest that you try to maintain a ratio of at least 3 variable to 1 fixed; that you "eagle-eye" variable expense at all times to keep it at minimum; that you refrain from saddling your factory with a fixed expense until you have considered all circumstances carefully; that you list fixed and variable expenses on the profit and loss statement separately so that the two classifications stand out in bold relief for comparative study from month to month and period to period. A change in the ratio need not mean disaster; in fact, it may be for betterment.

The condition of your processing equipment does have a bearing on the maintenance of a minimum overhead expense. From our survey work sheets covering the field studies authorized by RUBBER AGE, we gather that the replacement of old slicers for extruded stocks, obsolete mills, presses, molders, vulcanizers and other processing units, with modern equipment, has cut variable expenses from 7 to 29 per cent. This desirable effect of equipment modernization has been offset considerably by the fact that in many rubber factories the fixed charges are too high and it is impossible for the modern units to do anything about reducing this portion of overhead.

Items usually classified as fixed overhead expense in this industry are: rent or ownership expense, depreciation, taxes, insurance, interest on long-term loans and mortgages, interest on investment, allowance on bad debts, obsolescence, allowance for breakage and inventory differences, allowance for finished goods losses and licenses. A fixed charge is any charge that is fixed over a period of years against that of a variable expense, such as office expense, warehousing and stock handling expense, general plant expense, administrative expense, salaries, bonuses, commissions, etc.

It won't be hard to make sales of rubber goods during the next few years but it will be hard to salvage profits on the sales made unless you maintain top standards of efficiency on expense control and one way to accomplish that objective is to see that fixed and variable expenses are safely proportioned so that, unlike the Smith Rubber Company, you don't go under with overhead. Those rubber goods manufacturers who expect to emerge from this emergency with a fair profit and keep their equilibrium in the transition from wartime to peacetime activity must make sure that their management methods are efficient.

We know of a number of cases where the equipment is modern but the managerial routine is gay-ninety; hence, profits are way down under. Even in these days, with sales in the top brackets for all, such factories are not making the most of their opportunities. The rubber manufacturer, large and small, must understand and utilize every modern means of effecting tops in managerial efficiency and one means to this end is a thorough understanding of overhead.

Latex-Sprayed Cactus Fiber for Upholstery

THE Ford Motor Company is now using latex-sprayed fiber and animal hair as padding in the seats and back rests of its various automobile models. For years the motor car research men have been looking for a padding that would not become matted. The requirement was for a fiber that would take a "set" when treated with heat, and would remain resilient.

The largest fiber mill in the country furnished Ford engineers with many varieties of plant fiber gathered in countries all over the globe. By careful testing and process of elimination a fiber was found which answered the purpose. The fiber had been used commercially for a number of years but no attempt to "wave" it had ever been made. It comes from a type of cactus plant that grows in the wilds of Northern Mexico.

The center bud of the plant was found to yield a fiber that met every requirement for resiliency and long life, being tougher for its size than any others known to Ford engineers. Mexican peons shred the center bud of the plant and then send the fiber to the mill where the "wave" is put in. This is done by twisting thousands of strands of fiber into tight ropes which then are subjected to steam. The fiber is dried and after being combed and carded the pad is sprayed with latex to bind it and to increase its resiliency.

The fiber in crude and finished stages.

Editorials . . . . . .

Rubber for Defense

THAT the rubber manufacturing industry, like all other industries, is experiencing difficult times, but that adequate preparations have been and are being made to limit the difficulties to the barest minimums was the conclusion to be drawn from the symposium on "Rubber for Defense," held by the Rubber Division, A.C.S., during its just concluded two-day meeting, at Atlantic City, N. J., September 11 and 12. Messrs. Finger, Holt, Bridgwater and Coe participated in the symposium, and their frank and open discussions of the status of crude, synthetic and reclaimed rubber, as well as rubber chemicals and compounding materials, undoubtedly did much to clear the atmosphere.

For instance, a glance at recent statistics reveals the fact that the United States now has larger stocks of crude rubber on hand and afloat than at any other time in its history. Why, then, the need for curtailment in consumption? Mr. Holt answered this question for rubber manufacturers briefly but concisely. Rubber is a strategic material, not only for the manufacture of defense products made wholly of rubber, but it is also an essential product for materials which make the wheels of all industry go 'round, in peace as well as troubled times. The United States draws practically all of its rubber from the Far East and because of the delicate situation in that area it is absolutely necessary that this country amass a large and adequate supply of crude rubber—and quickly. Therefore, in order to build up its supply to the 500,000 tons desired, as quickly as possible, the curtailment program was put into effect. What will happen once the government reaches that point is anybody's guess at the minute.

What is the true status of synthetic rubber now and what will its future status be? That is a question that rubber manufacturers have been asking each other for months. Mr. Bridgwater answered that question by outlining the present production rate of the neoprene, butadiene and polysulfide rubber types and then giving estimates of the monthly production rate of these types of synthetic rubber by the end of 1942. His guess is—and we wager it is a good one—that the total production of all synthetic rubber by the end of 1942, including the output of the four government-sponsored plants now being erected, will reach 5,800 tons monthly. If butyl rubber is in production by that time the amount may easily reach 6,200 tons or more monthly.

Where will the to-be-constructed synthetic rubber plants secure their raw materials, many of which are now on the critical lists? Mr. Bridgwater answered that one, too. He revealed that three butadiene and three styrene plants are under consideration by the government as sources of raw materials for these plants, at least one of which has reached the contract stage. What will the government sell its synthetic rubber for? According to best beliefs, the price will match that of crude rubber, with the government absorbing the difference between selling price and cost.

So much attention has been paid of late to crude rubber supplies and synthetic rubber production that too many people were prone to overlook what effect the entire defense program picture was having or might be expected to have on the "salts and peppers" of the industry—that is, the rubber chemicals and basic compounding ingredients. Mr. Coe's talk, therefore, was particularly welcome. Discussing the importance of organic chemicals in the manufacture of rubber accelerators, antioxidants and special chemicals, he revealed that although in one or two cases certain rubber chemicals had to be withdrawn from the market because of the growing lack of basic raw materials, as a general rule the rubber chemical manufacturers were fulfilling the needs of the trade. He did say, however, that government and other officials might pay a little more attention to the needs of the chemical manufacturers insofar as their raw materials were concerned.

Some brief details of the addresses given in this important symposium on rubber for defense appear elsewhere in this issue in connection with a report on the Rubber Division's meeting. It is to be regretted that space allotments did not permit greater elaboration of the subject matter and it is to be hoped that the complete symposium will be published within a month or two in one of the official journals of the American Chemical Society.

CURRENT NEWS OF THE MONTH

SYMPOSIUM ON "RUBBER FOR DEFENSE" FEATURES TWO-DAY MEETING HELD BY RUBBER DIVISION, A.C.S., IN ATLANTIC CITY, SEPT. 11 and 12

THE problems confronting the rubber manufacturing industry under the present emergency were discussed from all angles at the meeting of the Rubber Division, A.C.S., held in Atlantic City, N. J., on September 11 and 12, in conjunction with the 102nd meeting of the parent society. The Division's meeting, which also featured the election of officers for the 1941-42 season, the presentation of ten technical papers, a report by the Crude Rubber and other committees, and a banquet, was unusually well attended, with 600 present at the technical session and 440 attending the banquet. The problems of the industry were aired at a special symposium on "Rubber for Defense" held on September 11th, the first day of the two-day meeting.

The election, held by letter ballot, resulted in the following slate of officers: *Chairman*, J. N. Street (Firestone); *Vice-Chairman*, J. T. Blake (Simplex Wire); *Secretary*, H. I. Cramer (Sharples Chemicals); *Treasurer*, C. W. Christensen (Monsanto); *Sergeant-at-Arms*, C. P. Hall. The new directorate consists of the following members: Per K. Frolich (Standard Oil), C. R. Park (Firestone), W. F. Tuley (Naugatuck Chemical), Fred H. Amon (Cabot), R. H. Gerke (U. S. Rubber), S. G. Byam (DuPont), and C. C. Davis (Boston Woven Hose). Election of officers by letter ballot, adopted at the Detroit meeting, was adjudged a preferential method, since the 315 ballots cast in the present instance were the largest number ever tallied at any meeting.

Four Papers in Symposium

Four papers were presented at the defense symposium. The first, "Cooperation of the Rubber Industry with Defense," was prepared by W. L. Finger but read by Richard A. May of the Rubber Section of the Office of Production Management. Mr. Finger, who was also associated with the O.P.M., found it necessary to resign from that agency a few days prior to the meeting, due to the pressure of private business. This paper stressed the importance of rubber to all industries, especially under emergency conditions, and mentioned several new rubber products developed in recent years for defense purposes.

E. G. Holt, Chief, Consumption Materials Division, Department of Commerce, presented a paper on "Present Status of Rubber." First stating that the United States now has more rubber within its confines than ever before in history, Mr. Holt went on to explain the necessity behind the present curtailment program. He stressed the point that this country is economically bound to the Middle East, because of rubber, tin and other commodities, and therefore freedom of the seas is essential to the well-being of the United States. He reviewed current restriction measures placed by the government on rubber processing and warned that greater regimentation may come if events abroad prove unsatisfactory to the allied forces.

"The Present Status of Synthetic Rubber," by Ernest Bridgwater, Manager, Rubber Chemicals Division, DuPont, was the subject of the third paper. After estimating that the production of neoprene types of synthetic rubber would total 6,300 tons for the year of 1941, that butadiene types would reach 4,000 tons, and polysulfide rubbers, 1400 tons, the speaker predicted that towards the end of 1942 neoprene types would reach a monthly production of 1600 tons and butadiene types, 900 tons. In addition, he said, government-sponsored plants would be turning out 3300 tons of butadiene copolymers monthly, so that there would be a total supply of 5800 tons of synthetic rubber available monthly.

J. P. Coe, General Manager, Naugatuck Chemical Division of U. S. Rubber, gave the fourth and final paper. Discussing the "Present Status of Rubber Chemicals and Reclaimed Rubber," Mr. Coe first outlined the position of the rubber reclaimers, stating that thus far they were able to meet all increased demands, that production in the first seven months of 1941 exceeded consumption, and that the capacity of the reclaiming plants was 300,000 tons annually on a seven-day basis. As far as rubber chemicals were concerned, he revealed that certain basic materials used in the manufacture of such chemicals, such as aniline and formaldehyde, were becoming somewhat scarce, but up to the present no real shortage of any rubber chemicals or compounding ingredients had resulted. He urged, however, that more attention be given to the rubber chemical manufacturers insofar as their raw materials are concerned.

At the business meeting, George A. Sackett, Chairman of the Crude Rubber Committee, reported that the Committee has recommended that the tests for crude rubber and latex previously offered as "tentative" be adopted as "standard." The complete text of the tests in their latest form will be published shortly in *Rubber Chemistry & Technology*. Mr. Sackett also reported that further work on aging and sampling tests was progressing and that contact is being maintained with technologists in England and the Far East. The Committee offered its services to buying organizations and to government agencies in any manner in which it can be useful.

Charles R. Haynes, of the Binney & Smith Co., Chairman of the Membership Committee, reported an increase in membership from approximately 700 to 790, or 12%, in the past year. It was announced at the meeting that the Executive Committee had decided to meet in Memphis next spring during the 103rd Meeting of the American Chemical Society.

Ten Technical Papers Given

The ten technical papers were presented at sessions held on Friday morning and afternoon, September 11 and 12. Abstracts of all of these papers appeared in the August issue of RUBBER AGE. Two other papers of special interest to the rubber industry were presented at other meetings of the Society, one on "Synthetic Rubber Coming of Age" being given by Per K. Frolich (Standard Oil) before the Division of Chemical Education on Tuesday, and the other, "Industrial Progress in Synthetic Rubber-Like Polymers," by H. I. Cramer (Sharples Chemicals), before the Division of Paint, Varnish and Plastics Chemistry.

The banquet, held at the Ambassador Hotel, on Thursday evening, September 11, featured a good dinner and one of the most complete and diversified entertainment programs ever presented before the Division. The banquet committee was composed of Peter P. Pinto (RUBBER AGE), as chairman, and S. G. Byam (DuPont), A. H. Nellen (Lee Rubber), F. E. Traflet (Pequanoc), W. F. Lamela (Okonite), B. C. Ross (Vanderbilt), and G. J. Wyrough (Whitehead Bros.). The entertainment was made possible by donations received from a number of companies listed elsewhere in this issue.

Carbon Percentages... Where Now?

THE 1940's

Micronex loading of approximately 55% in use. Broader application of this and higher loadings speeded by rubber conservation.

THE 1930's

Advance to the range of 45% to 50% Micronex.

THE 1920's

Establishment of 40% Micronex, with steps toward higher proportions.

THE 1910's

Discovery of Micronex reinforcement and development of the moderate loadings which pointed the way to super mileage.

MICRONEX WILL DISPLACE MORE RUBBER IN THE INTEREST OF NATIONAL DEFENSE ECONOMY

MICRONEX

Beads or Compressed

A COLUMBIAN COLLOID

BINNEY & SMITH CO., *Distributor* • COLUMBIAN CARBON CO., *Manufacturer*

MICRONEX

Points The Way To

Higher Carbon Loadings

Advances in tire construction and in the art of rubber processing provided starting points in the past for each successive increase in Micronex loading. In the beginning, Micronex reinforcement balanced the carcass improvement accomplished by the introduction of cord fabric.

Early increases in Micronex loadings were attended with cautions and precautions. Super mileage tires were possible only after engineering developments made higher loadings practicable.

At the same time the refinement of Micronex and standardization of special Micronex grades provided the compounder with the essential ingredient for super mileage.

Micronex first displaced less effective pigments. Modern technology has now opened the way for the displacement of more rubber in tire tread compounds. Special types of Micronex provide the flexibility necessary to meet individual situations.

Micronex loadings can now be increased to a point which will result in important economy of rubber while maintaining proper balance in tire engineering. Use the domestic colloid—Micronex—to conserve the imported colloid—crude rubber.

Our Technical Service Department is in position to cooperate in selecting the type of Micronex which will best enable you to meet the situation created by rubber restriction.

•

BINNEY & SMITH CO. • **COLUMBIAN CARBON CO.**

DISTRIBUTOR — MANUFACTURER

MICRONEX MEANS MORE MILEAGE

NEW SUBCOMMITTEE NAMED FOR RUBBER LABOR PROBLEMS

The appointment of a subcommittee on labor problems of the Rubber Industry Advisory Committee was announced on September 4 by the Bureau of Clearance of Defense Industry Advisory Committees in Washington. Members of the new subcommittee include the following: Fred Climer (Goodyear), H. B. Spencer (U. S. Rubber), Harold B. Leland (Hood Rubber), J. H. Matthews (Raybestos-Manhattan), and J. F. Joseph (Cincinnati Rubber).

The new subcommittee met on September 5 with the Labor Advisory Committee previously appointed by Sidney Hillman, Associate Director General of the O.P.M. The joint conference is understood to have treated with the problems of quota allocations to rubber manufacturers, with the labor executives stressing plans for plant-by-plant rather than company-by-company quotas.

Both the labor and management groups are understood to have concurred in a resolution calling for a full study of the problem of allocations as they affect employment and adjustment of cases where quotas may be apt to dislocate component parts of the industry.

In some quarters the resolution was considered as a long step toward a compromise whereby the rubber companies will give full information of their allotments to individual plants and will agree to maintain production schedules on a proportionate scale insofar as national defense orders will permit. Mr. Hillman is understood to be strongly in favor of the plant allocation system.

QUOTA FIXED AT 120% FOR FOURTH QUARTER OF YEAR

In an apparent effort to speed up the accumulation of reserve stocks in the United States, the International Rubber Regulation Committee, meeting in London on August 19th, raised the permissible export quota for the fourth quarter of the current year to 120% of basic quotas. It was also announced that overshipments or undershipments during 1941 will not be carried over into 1942. Another reason for the higher quota was seen in the war needs of Russia.

Since the export quota for the first nine months of 1941 was set at 100%, raising the quota for the fourth quarter to 120% brings permissible exports from signatory countries to the restriction scheme up to 1,654,452 long tons, excluding French Indo-China. This is an increase of almost 100,000 tons over the basic 1941 export quota of 1,554,700 tons. Permissible shipments in the fourth quarter amount to 466,410 tons.

Based on the new quota it is quite possible that the United States may receive well above 100,000 tons of rubber a month for the next few months, which means that if present curtailment regulations are maintained, reserve stocks may be swelled by some 200,000 tons by the end of the year. At the end of July Government-held stocks amounted to 218,844 tons, of which the Commodity Credit Corp. owned 91,938 tons and the Rubber Reserve Co. 126,906 tons.

PRIORITY IS GRANTED ON SPECIAL REPAIR ORDERS

A plan to keep defense and essential civilian industries going at full speed was announced by Donald Nelson, new director of priorities of the O.P.M., on September 9. The plan grants immediately a preference rating of A-10 for repair parts required by twenty industries, including the rubber and rubber products industries, without the necessity of an application to the O.P.M. for a preference rating certificate.

According to the plan, the purchaser may simply note on his order that the commodity, equipment, accessory, part, assembly or other product is required to fill a repair order of an industry classified as essential. It displaces the Maintenance and Repair Order announced by Edward Stettinius, Jr., the former priorities director, on August 8. In issuing the new plan, Mr. Nelson stated that it was designed primarily to protect industry against sudden breakdowns.

CARBON BLACK PRODUCTION SETS NEW RECORD IN 1940

Production of carbon black set a new record in 1940 when 568,792,000 pounds were produced, an increase of approximately 40,000,000 pounds over the previous year. Total sales, however, dropped in the same year, only 527,774,000 pounds being sold or approximately 40,000,000 pounds less than in 1939. The data is from the Minerals Yearbook Review.

The sales decrease is attributed to the slight loss in domestic demand and the 13 per cent drop in exports. Nearly 90 per cent of the gas black sales were made to the rubber industry which took 310,179,000 pounds. Ink companies were second, with some 25,000,000 pounds, and the paint industry was in third place, with nearly 7,000,000 pounds consumed. Exports amounted to 177,617,867 pounds, worth $7,823,820, and the United Kingdom took about 45 per cent of the total.

The unexpected loss in exports this year should be counteracted by the increased domestic sales, the Yearbook believes. For not only is rubber deemed an important defense commodity by the Army and Navy Munitions Board but considerable carbon black is now being used to reduce glare on airport runways. Furthermore, the Yearbook states, other special uses are being developed.

GENERAL TIRE & RUBBER CO. INTRODUCES "SPATS" FOR AUTO TIRES

Right on the heels of the announcement from Washington that white sidewall tires have been officially banned until further notice, comes word of a new invention from the General Tire & Rubber Co., *i.e.*, "Spats," or metal sidewall trim rings for tires. "Spats" are gleaming white spring steel rings that are said to make ordinary black tires look dressier than actual white sidewalls. According to General they are superior to real white sidewall tires in that they will not scuff against curbs. They are set back from the bulge of the tire so that the black sidewall takes the blows. "Spats" also protect the wheels from salt water which rusts and corrodes, keep the rim free from dirt and gravel, and cover wheel-balancing weights with an attractive white cover. They are also easily cleaned. Made in sizes to fit all popular 15 and 16-inch wheels, "Spats" are a permanent addition to a car, will outlast several sets of tires, and cannot be damaged even though the tire be run flat.

NAMES IN THE NEWS

S. WALLACE MURKLAND, assistant controller of the Western Electric Co. since 1927, has been named controller of that company, succeeding RICHARD H. GREGORY who formally retired on August 31 after forty-three years of service.

WALTER J. GELDARD, associated with Fisk Rubber for many years and until recently associated with tire development activities for U. S. Rubber at the Detroit plant, has joined the development and sales service staff of the latter company's Naugatuck Chemical Division. He will be stationed at the Naugatuck, Conn., plant and will specialize on tire and tube problems.

HARRY K. CLARK, vice-president and general manager of the Norton Co., Worcester, Mass., has been added to the staff of the Office of Production Management as a dollar-a-year executive.

HENRY S. BRAINARD, law director of Cleveland since 1939 and a member of that city's legal department for 15 years, has accepted a position as assistant counsel of the Firestone Tire & Rubber Co., Akron. He succeeds JOHN H. JOSS, resigned.

E. L. LUACES, chemical and patent consultant, is now associated with Toulmin & Toulmin, patent lawyers, Mutual Home Building, Dayton, Ohio, where he will prepare and prosecute patent matters in the fields of chemistry and chemical engineering.

P. S. VORMELKER, associated for many years with the Aetna Rubber Co. and more recently connected with the Dryden Rubber Co., has been placed in complete charge of all technical work for the Dunne Rubber Co., Ashtabula, Ohio.

DR. W. W. LEIGH, head of the Commerce Department at Akron University, has been named special consultant for the rubber industry in the office of Leon Henderson, U. S. Price Administrator.

ALVIN H. LYBECK, who majored in chemistry and minored in chemical engineering at the Polytechnic Institute of Brooklyn, receiving his B.S. in 1941, has joined the editorial staff of the *India Rubber World*.

T. SPENCER SHORE, vice-president and treasurer of the General Tire & Rubber Co., Akron, has been named assistant chief of the Bureau of Clearance of Industry Advisory Committees of the Office of Production Management. He will represent the rubber industry particularly.

FRANKLIN G. SMITH, president of the Ohio Rubber Co., Willoughby, Ohio, writes on "Apprentice-Training Programs" in the August, 1941, issue of the *Executives Service Bulletin*, house organ of the Metropolitan Life Insurance Co.

H. E. MALCOMB, until recently manager of the special purpose tire department of U. S. Rubber, has been named assistant to H. N. HAWKES, general sales manager of that company's tire division. R. P. F. LIDDELL has been placed in charge of the company's airplane tire activities, while A. B. FENNELL has been named sales manager and R. E. HEDLUND assistant sales manager of the tire division.

FREDERIC C. BENNETTO, JR., has been elected vice-president of the Elm City Rubber Co., New Haven, Conn., to succeed the late B. Y. MCLEMORE.

WILBUR ROWE has been named purchasing agent of the Raybestos Division of Raybestos-Manhattan, Inc., Stratford, Conn., to fill the vacancy caused by the recent death of JOSEPH D'LOUHY. He was formerly in charge of the division's order department.

E. A. WILLSON, connected with American Anode, Inc., for a number of years, has joined the Hydrocarbon Chemical & Rubber Co., Akron, in charge of the recently created latex division of that company.

JAMES E. CALDWELL, a certified public accountant of New York City, has been appointed assistant comptroller of the Goodyear Aircraft Corp. He is a graduate of Northwestern University.

Plan Butadiene Factory

An appropriation of $7,500,000 for the construction of a factory to produce butadiene, the basic material for most synthetic rubber production, was made early this month by the Defense Plant Corp., a subsidiary of the Reconstruction Finance Corp. The plant will be built at Baton Rouge, La., and operated by the Standard Oil Co. of Louisiana.

Seeks Brazilian Agency

The Companhia Comissaria Brasileira, 818 Rua Florencio de Abreu, Sao Paulo, Brazil, is interested in hearing from manufacturers of various rubber compounding ingredients, including carbon black, accelerators, antioxidants, softeners, solvents, etc., who are seeking representation in Brazil. Interested companies should write direct.

Ferguson Named Sales Manager

Ralph M. Ferguson, associated with the St. Lawrence Chemical Company for the past several years, has been appointed sales manager of the recently-

Ralph M. Ferguson

organized Naugatuck Chemicals, Ltd., Elmira, Ontario, Canada. St. Lawrence Chemical has represented the Naugatuck Chemical Division of the U. S. Rubber Co. for many years, but effective October 1 the sale of these chemicals will be transferred to Naugatuck Chemicals, Ltd. Mr. Ferguson will have his headquarters at the plant in Elmira, but will also have a sales office in Montreal.

Introduce "Byrene"

"Byrene," described as a "chlorinated polymerized rubber derivative scientifically combined with a synthetic polymer of high molecular weight," has been introduced as a new plastic material by Richards, Boggs & King, Inc., of New York and Chicago. Basically, the new material is a coated Pliofilm. It comes in several pastel colors, is thoroughly waterproof, and will not mildew or stick. It is already being used in the fabrication of shower curtains and current plans call for its use in raincoats and other rainwear.

Harold A. Osborne

Harold Allen Osborne, vice-president, general manager and a director of the United Shoe Machinery Corp., died at his home in Swampscott, Mass., on September 7 at the age of 55. Mr. Osborne was born in Lynn and was graduated from Dartmouth College in 1909. In addition to his duties with United Shoe Machinery he held directorships in a number of other companies, including the B.B. Chemical Co. Mr. Osborne was a member of the Boston Chamber of Commerce and a 32nd degree Mason. He leaves a widow.

WM. H. STEVENS, OF MONSANTO, DISCOUNTS RUBBER SHORTAGE

William Henry Stevens, noted British technologist, now in the United States to study American methods of application of synthetics, particularly in aircraft construction, discounted any fears of a critical shortage of natural rubber in the United States or Great Britain in a statement issued at St. Louis on August 21. Mr. Stevens is now associated with Monsanto Chemicals, Ltd., of London, and is visiting the Monsanto plant in St. Louis as well as a number of leading rubber factories while in this country.

"Even though supplies from the important rubber producing areas of British Malaya and the Dutch East Indies should be cut off, which still seems highly improbable, the plantations of India, Ceylon and South America would yield sufficient natural rubber for all military purposes although civilian supply would suffer," Mr. Stevens said. "As long as we have ships we need not worry about rubber."

"Recent evidence from captured German war equipment indicates that the Nazis are getting virtually no natural rubber and have been reduced to the use of synthetic and reclaimed rubber entirely," Mr. Stevens said. "Some of the German airplane and tank parts which were formerly made of rubber are being replaced by materials made from plastic-bonded wood fibre, of which Germany has a good supply.

"Most of the German synthetic rubber is of the butadiene type, for which petroleum is one of the best raw materials. Thus it is apparent that the Nazi dependence on oil goes beyond fuel and lubrication, and it is easy to see why the Germans are so vitally interested in the oil fields of the Near East."

Commenting on the raw materials situation in England and Germany, Mr. Stevens pointed out that through chemical science many of today's natural raw materials have been made interchangeable. "Gasoline, for example, can be made from coal, if petroleum is unavailable. Textiles can be made from wood or coal as well as natural fibres. Plastics, made from coal or petroleum, can replace some of the metals. The Germans are even making sugar out of wood.

"Although these changes involve new plants and equipment which may take months or several years to build, the fact that they are taking place indicates that today a country need not have all of the strategic raw materials to wage effective war."

A new heavy-duty, two color tube, red with a purple base, giving greater resistance to heat at high speeds, has been announced by the U. S. Rubber Co. It will be known as the U. S. Royal.

Coming Events

Sept. 20. Chicago Rubber Group, Golf Outing and Dinner Dance, Pickwick Golf Club, Glenview, Ill.

Oct. 3. Boston Rubber Group, University Club, Boston, Mass.

Oct. 3. Detroit Rubber & Plastic Group, Detroit Leland Hotel, Detroit, Mich.

Oct. 7. Los Angeles Rubber Group, Mayfair Hotel, Los Angeles, Cal.

Oct. 10. Chicago Rubber Group, Fall Meeting, Congress Hotel, Chicago, Ill.

Oct. 11-14. National Association of Waste Material Dealers, Fall Convention, San Francisco, Cal.

Oct. 12-15. American Society of Mechanical Engineers, Fall Meeting, Louisville, Ky.

Nov. 3-5. American Institute of Chemical Engineers, Annual Meeting, Cavalier Hotel, Virginia Beach, Va.

Dec. 1-6. 18th Exposition of Chemical Industries, Grand Central Palace, New York City.

Apr. 20-24. 103rd Meeting, A.C.S., Memphis, Tenn.

Suspend Futures Trading

At the request of Leon Henderson, then head of the Office of Price Administration and Civilian Supply, and now director of the Civilian Supply Division of the Office of Production Management, the Board of Governors of the Commodity Exchange ordered the suspension of trading in rubber futures on the Exchange on August 14. Mr. Henderson based his request on the fact that the Rubber Reserve Co. was now the sole buyer of crude rubber in the Far East and has fixed the selling price for ribbed smoked sheet at 22½ cents and under these conditions it was believed that it would be in the best interest of the rubber trade and the national defense program that trading on the Exchange be discontinued. At the time of the suspension there were 1,053 contracts outstanding, and a special committee appointed by the president of the Exchange is currently discussing methods for liquidating these contracts.

Organize Tensylon, Inc.

Tensylon, Inc., a New York corporation with offices and plant at Eldred, N. Y., has been organized by the Tensolite Corporation of North Tarrytown, N. Y., manufacturers of "tensilized" rubber hydrochloride. The new company has been sub-licensed to make and sell generally round plastic yarn, either solid or covered, except covered wire and rubber. It is also licensed to sell to the textile and kindred industries the crushed yarn product of the Tensolite Corp. known as "Crille."

RUBBER SAFETY SECTION COMPLETES PROGRAM PLANS

The Rubber Section of the National Safety Council has released its tentative plans for the two-day session to be held at the Stevens Hotel, Chicago, the week of October 6-10, in conjunction with the 30th National Safety Congress and Exposition. The Rubber Section will hold its sessions on Monday and Tuesday, October 6 and 7. Monday has also been designated as Rubber Section Day at the Exposition.

The meeting will get under way on Monday afternoon, at 2:30 P.M., with a report on sectional activities by Oliver Hopkins (U.S. Rubber, Providence), general chairman of the Section. An address on a subject and by a speaker yet to be selected will follow. A panel discussion on "Plant Problems" will then be held, with W. L. Schneider (Goodrich) presiding. The following topics will be discussed:

Training Roll Release Emergency Crews, by J. M. Kerrigan (U.S. Rubber Reclaiming); *Handling Equipment: Hose Mandrels, Molds, Small Hand Tools, Portable Electrical Equipment,* by R. A. Bullock (Corduroy Rubber); *Hazards of Unfired Pressure Vessels,* by Lewis P. Gove (Mutual Boiler Insurance Co.); *Training New Employees in Safety,* by Urban L. Moler (Inland Mfg. Div., General Motors); *Highway Transportation Problems,* by A. W. Meinke (Indemnity Insurance Co. of North America); *How Safety Shoes Are Sold in the Plant,* by J. E. Lovas (U.S. Rubber, Passaic).

A special luncheon will be held on Tuesday at 12:30 P.M. during which election of officers will take place and outstanding facts and the presentation of awards in connection with the Section's Safety Contest for 1940-41 will be made. A talk will also be given by a speaker yet to be selected.

The session to be held on Tuesday afternoon will include the following papers: *Muzzle That Bite,* by E. W. Beck (U.S. Rubber, New York); *Health Hazards in Handling Solvents,* by Dr. J. Newton Shirley (Arrow Mutual Liability Insurance Co.); *Accident Hazards in Handling Solvents,* by P. W. Gumaer (Barrett Co.). W. H. MacKay (Dunlop) will lead one of the discussion periods. A colored motion picture on "How Fires Start in Industry" will also be presented and discussed by F. J. Emmons of the Associated Factory Mutual Fire Insurance Co. at this session.

New Carbon Black Plant

Immediate construction of a new carbon black plant by the Columbian Carbon Company at Eunice, New Mexico, was announced last month. The plant, which will consume approximately 20,000,000 feet of waste gas per day, will help meet national defense demands for carbon black. Equipment to begin construction at once is said to be available.

NEWS IN BRIEF

The high defense priority rating of A-2 has been given by the Director of Priorities of the Office of Production Management to equipment needed by research laboratories. Laboratories experiencing difficulties in securing essential materials should apply to the Chemical Branch of the O. P. M.

A tire conservation plan designed to help the motorist get more mileage out of his tires to be operated through its dealers has been announced by U. S. Rubber. Under the plan, the motorist will receive upon registration with any U. S. Tire dealer a numbered card entitling him to prior claims on the dealer's service facilities.

Clothing and equipment repair shops designed to serve from 20,000 to 40,000 men and operated by 50 civilian experts soon will be opened at 26 Army camps. Rubber and leather footwear will be handled in the new repair units.

A new revised wall chart, giving briefly approved methods for diagnosing and correcting customers' battery troubles by hydrometer and voltmeter tests, has been issued by the Association of American Battery Manufacturers, Inc., 2706 First Central Tower, Akron, Ohio.

Pagel, Horton & Co., Inc., 347 Madison Ave., New York City, dealers in rubber and other commodities, celebrated its twenty-fifth anniversary on September 1. The company was incorporated on September 1, 1916.

Globe Woven Belting Co., Buffalo, N. Y., has almost completed the construction of a new building, 125 x 75 feet, which will accommodate the expanded endless woven rubber belt department. Burt Wetherbee is in charge of the department.

The Aluminum Company of America, Pittsburgh, Penna., is now issuing a series of service bulletins which give national defense industries the advantage of the most recent work of the company's technical departments. The first bulletin lists 100 references on aluminum of special interest to manufacturers of defense materials.

In response to unprecedented demand for comprehensive information on metals, non-metals, fuels and mineral products, the U. S. Bureau of Mines has scheduled publication of its Minerals Yearbook more than three months in advance of last year's date.

Herbert R. Simonds, 20 Christopher St., New York City, has started publication of the "Plastics News Letter." To be issued twice a month or more, depending on the amount of material available, the letters contain quotes from various newspapers and journals pertaining to the plastics art. Trial subscriptions are being accepted for $1.00 per month for a period of four months.

General Atlas Carbon Division, 60 Wall St., New York City, has issued its annual Football Calendar showing 1941 schedules of leading colleges and universities. Copies are free on request.

An outline of the current status of the rubber industry in the United States by Everett G. Holt is given in the latest issue (No. 33) of Part 10: Rubber and Its Products of the Industrial Reference Series published by the Department of Commerce.

The Non-Breakable Button Corp., Milwaukee, Wisc., has entered the mechanical rubber parts business in a big way and is already turning out spark plug insulators and pressure caps for hydraulic jacks. Approximately 25% of the company's present output is on defense orders.

An interesting booklet, entitled "Dunlop Serves the Empire," has been issued by the Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Canada. The important role now being played by the company's various rubber products is described and illustrated.

Formaldehyde, paraformaldehyde and hexamethylenetetramine were placed under full priority control in a major move toward tightening the reins on the entire chemical industry last month. A preference rating of A-10 has been placed on these materials which means that producers are required to accept defense orders except under certain conditions.

More than 36,000,000 yards of duck material is being dyed and finished for the Quartermaster Corps as part of the 1942 Army tent program. Cloth is furnished by the Quartermaster Corps to successful bidders on the project which involves a new formula recently adopted for use by the Army.

The latest issue of *Thiokol Facts*, house organ of the Thiokol Corp., Trenton, N. J., contains data on the various uses of synthetic rubber in defense. Pictures show the use of synthetic rubber in bullet-proof oil lines, barrage balloons, fuel tanks, destroyers and submarines, etc.

Contributors to Banquet

The following companies contributed donations which made possible the excellent entertainment furnished at the banquet held by the Rubber Division, A.C.S., on September 11 at Atlantic City, further details of which will be found on page 410 of this issue:

Advance Solvents & Chemical Corp., L. Albert & Son, American Cyanamid & Chemical Corp., American Zinc Sales Company, Binney & Smith Company, Godfrey L. Cabot, Inc., Continental Carbon Company, Curran & Barry, E. I. du Pont de Nemours & Co., Inc. (Rubber Chemicals Div.), Farrel-Birmingham Co., Inc., General Atlas Carbon Company, C. P. Hall Company, Herron & Meyer, J. M. Huber, Inc., Midwest Rubber Reclaiming Company, Monsanto Chemical Company (Rubber Service Dept.), Moore & Munger, H. Muehlstein & Co., Inc., National Rubber Machinery Company, Naugatuck Chemical (Division of U. S. Rubber Co.).

New Jersey Zinc Sales Company, Pequanoc Rubber Company, Philadelphia Rubber Works Company, Pittsburgh Plate Glass Company (Columbia Chemical Div.), Rare Metal Products Company, A Schulman, Inc., Henry L. Scott Company, Southeastern Clay Company, Standard Chemical Company, Stauffer Chemical Co., St. Joseph Lead Company, Thiokol Corporation, Titanium Pigment Corporation, U. S. Rubber Reclaiming Company, Inc., United Carbon Company, R. T. Vanderbilt Company, Inc., Vansul, Incorporated, C. K. Williams & Company, Wishnick-Tumpeer, Inc., Xylos Rubber Company.

Camelback Sales Increase

Sales of camelback increased 24.4% in the United States during the first six months of the current year as compared with the corresponding period of the previous year. The trade's sales totalled approximately 26,000,000 pounds, of which 60% was first line at 27 cents a pound, the grade used principally for renewing truck casings. Second line camelback, which sells for 22c a pound, is also showing steady gains.

Occupies New Offices

As of September 1, the general offices of the United Carbon Company will be located in the newly-completed United Carbon Building on Kanawha Boulevard at Broad Street in Charlestown, West Virginia. The new building has been termed one of the most imposing edifices of the city.

The Toledo Industrial Rubber Co., Toledo, Ohio, announces an increase in its laboratory facilities. Testing equipment is now amply sufficient for production control and development to both automotive and government specifications. A. W. Oakleaf is in charge of the department.

EMPLOYMENT OF LEARNERS ALLOWED AT SPECIAL RATES

The employment of learners at the special rate of 30 cents an hour for a period of eight weeks will be allowed in rubber specialties factories upon issuance of certificates, General Philip B. Fleming, Administrator of the Wage and Hour Division of the Department of Labor announced on August 22. The Hearings Branch of the Division will mail application forms to employers requesting them. A wage minimum of 40 cents an hour was recently decreed for the rubber manufacturing industry.

Learner certificates will be limited to employment of hand workers, machine workers in make-up processes only, and inspectors, and the number of learners will be limited to not more than 10 per cent of the number of workers employed in the plant.

While these are the terms upon which learner certificates will be generally issued, special consideration will be given to individual circumstances where these terms would not appear to be applicable, General Fleming said. Certificates will not be issued in areas where the establishment of a sub-minimum wage rate for beginners would endanger existing higher wage structures. These terms are preliminary, it was pointed out, and subject to change when additional information about the industry becomes available.

The Hearings Branch acted under the general learner regulations to determine the terms upon which certificates will be issued, after conferences on the subject and independent investigation which indicated a need for learners in various occupations and a lack of available experienced workers.

When certificates are issued they will define a learner for this industry as "a worker who has had less than 8 weeks (320 hours) experience in the industry in the last three years."

REORGANIZATION OF O. P. M. RESULTS IN SIX DIVISIONS

Concurrent with the announcement by President Roosevelt on August 28 of the new Supply Priorities and Allocations Board, created within the Office for Emergency Management, the function of which will be to divide available materials, power, fuel, and other commodities between military needs, defense-aid needs and the total civilian needs of the United States, and to allocate supply among the different civilian uses, several changes in the personnel of the Office of Production Management were made.

Hereafter, the O. P. M. will function through six major divisions, according to William S. Knudsen, director general. The divisions and their directors are: *Civilian Supply*, Leon Henderson; *Labor*, Sidney Hillman; *Materials*, William L. Batt; *Priorities*, Donald M. Nelson; *Production*, W. H. Harrison; *Purchases*, Douglas L. MacKeachie. Edward Stettinius, Jr., former director of priorities, has been made Lease-Lend Administrator.

FINANCIAL

United Carbon Co.

First Half: Net profit of $957,801, equal to $2.41 each on 397,885 shares of no-par common stock, which compares with $902,371, or $2.27 a share, last year. Provision for estimated taxes amounted to $506,000 compared with Federal taxes of $224,000 for the same period in the previous year.

Columbian Carbon Co.

First Half: Net profit of $1,904,036, after provision of $900,000 for Federal taxes, equal to $3.54 a share on 537,406 capital shares, which compares with $1,858,280, or $3.46 a share, in the corresponding period of 1940. Sales were 27% ahead of the 1940 period.

Correction

The Mansfield Tire & Rubber Co. showed a loss of $2,966.64 for the first half of the year and not a net profit of $49,088 before Federal taxes as previously reported. For the three months ended June 30, 1941, the company had a net profit of $67,361 before provision for Federal income and excess profits taxes.

Intercontinental Rubber Co.

First Half: Net income of $149,909, after estimated provision of $142,257 for tax deductions, which compares with net income of $157,591 after $87,346 for taxes last year. Profit from operations was $419,342, compared with $345,420.

Baldwin Rubber Co.

Year Ended June 30: Net income of $611,711, equal to $1.49 each on 315,254 capital shares. For the nine months ended June 30, 1940, net income amounted to $402,168, or $1.27 a share on 316,754 capital shares.

Raybestos-Manhattan, Inc.

First Half: Net profit of $1,142,973, equal to $1.82 a share on 628,100 shares of no-par capital stock, which compares with $919,159, or $1.46 a share, last year. The report excludes earnings of Canadian subsidiaries.

National Rubber Machinery Co.

First Half: Net profit of $158,849, equal to $1.03 a share on 154,000 no-par capital shares, which compares with a net loss of $3,516 reported by the company for last year.

CHICAGO RUBBER GROUP PLANS ACTIVE MEETINGS FOR FALL

The Chicago Group, Rubber Division, A.C.S., has mapped out tentative plans for the Fall season. On September 20, a golf outing and dinner dance will be held at the Pickwick Golf Club in Glenview, Ill. There will be golf, soft ball, and swimming, if the weather permits. A dance orchestra will furnish music during dinner. Ladies are invited to this affair.

On October 10 the Group will hold a meeting in the Congress Hotel, Chicago. The meeting will feature the presentation of two moving pictures, "Robots and Rubber" and "Rubber at the Rouge," by Andrew H. Hale of the Farrel-Birmingham Co. The first picture shows the "mill room of the future" while the second depicts the manufacture of tires and tubes in the modern Ford tire plant. These pictures, first shown at the meeting of the Rubber Division in St. Louis last Spring, are of exceptional interest to rubber technologists.

As an added feature to the October 10th meeting, the Membership Committee of the Chicago Rubber Group has arranged for a block of tickets to the Northwestern-Wisconsin football game on Saturday, October 11. Reservations for this game, accompanied by payment, must be in the hands of the secretary of the group, Ben Lewis, c/o Wishnick-Tumpeer, Inc., 435 No. Michigan Ave., Chicago, by September 27th. The tickets are $2.75 each and only a limited number are available. Ladies are welcome at the game.

Offers Extensions Course

The Department of Chemistry of McGill University, Montreal, Canada, will offer this fall for the fourth consecutive year an extension course on the Chemistry and Technology of Resins and Lastics. The course, which will be given evenings, will begin about the middle of October and will continue for sixteen weekly lectures. As far as time permits it will cover the theoretical chemistry and practical technology of synthetic plastics, coating resins, fibres and rubbers. The instructor will be Dr. R. V. V. Nicholls, assistant professor of Chemistry. Dr. Nicholls is also secretary of the Montreal Rubber and Plastics Group. All inquiries should be sent to his attention.

Synthetic Plant Destroyed

According to a report made by the British Air Ministry on September 7th, one of Germany's two synthetic rubber plants, located at Huls in Westphalia, was either partially or completely destroyed by bombs dropped in a raid by R.A.F. night fliers. The R.A.F. report stated that the plant was "belching smoke and flames" when the fliers departed.

CANADIAN NEWS

R. C. Berkinshaw, who in peace time is general manager of the Goodyear Tire and Rubber Company of Canada, Ltd., Toronto, is now practically the czar of all Canadian industry.

Six months ago, Mr. Berkinshaw was named Director General of the Priorities Branch, Department of Munitions and Supply, at Ottawa. So thoroughly and efficiently did he perform this job, that recently Hon. C. D. Howe, Minister of Munitions and Supply, handed him complete authority for war supply in the Dominion. In addition to being Director General of Priorities, Mr. Berkinshaw now becomes chairman of the Wartime Industries Control Board and also Controller General of the twelve wartime controllers who are in charge of steel, metals, power, machine tools, oil, motor vehicles, ship repairs, timber, chemicals, transit, and civilian construction. He has also been appointed to the newly enlarged Wartime Prices and Trade Board so that there will now be for the first time coordination between war supply and price control.

The Wartime Industries Control Board under Mr. Berkinshaw is to be expanded into a powerful authority charged with complete direction, planning and control of all matters affecting war supply. As Controller General it will be his duty to tie together the dozen independent controllers who, until this time, have only been loosely organized.

Setting up of rubber control and curtailment of civilian consumption similar to that in effect in the United States will undoubtedly occur in Canada. Since there is already a government company—The Fairmont Company, Ltd. — for handling the government's war commitments in rubber it is probable that mandatory control will be exercised by this organization.

Manufacture of white wall tires, except under license, is already prohibited, although this ban was posted by J. H. Berry, Motor Vehicle Controller, instead of by the rubber reserve company and was intended to conserve zinc as much as it was to save rubber.

Imports of crude rubber into the Dominion for June of this year amounted to nearly three times as much as those of a year ago. Imports were 6,312,139 pounds compared with 2,381,871 for June of 1940. Imports for the first half of the year amounted to 55,749,702 pounds, an increase of 35.8 per cent over the first half of 1940.

Construction of the plant of Naugatuck Chemicals, Ltd., at Elmira, Ontario, for the production of aniline is well under way and is expected to be in operation this fall. In addition to Paul C. Jones, president, and R. B. Marr, general manager, whose appointments were previously announced, other officers of the company are M. C. Simpson, treasurer; I. W. Holme, secretary; G. R. Dobbin, assistant secretary-treasurer; and H. Wintsch, production manager.

The Viceroy Manufacturing Company, Toronto, has purchased the rubber factory at Beamsville, Ontario, which was formerly operated by the Premier Tire and Rubber Company.

Additional plant space became necessary because of the company's production of war material and follows a $100,000 expansion program completed at the Toronto factory earlier in the year. In addition to wartime rubber products similar to peacetime production Viceroy is also producing machine products and automatic machinery, the latter lines being an outgrowth of machine shop facilities developed for the production of rubber molds. The new plant at Beamsville is expected to go into production on hard rubber goods some time in October.

Work on the foundations of a new building which will be used for production of polyvinyl chloride has been started by Shawinigan Chemicals, Ltd., at Shawinigan Falls, Quebec. Mr. V. G. Bartram, president of the company, recently traveled to Washington to interview officials there in regard to obtaining priorities for necessary equipment which must be purchased in the States.

The volume of business done by Canada Wire and Cable in the first half of 1941 was considerably higher than it was a year ago, the company states. Estimated net profits after all charges are $418,475 as compared with $380,000 for the first half of 1940. Gross profits from operations in the first six months totalled $1,500,000, and from this was deducted a tax provision of $952,000 and $161,000 for depreciation and other charges.

The B. F. Goodrich Rubber Co. of Canada, Ltd., Kitchener, paid 3½% interest on its 7% cumulative bonds on September 1. This was the first payment on these bonds since 1936 when a 4¼% dividend was paid. Interest is cumulative and arrears become payable at the date of maturity of the bonds.

Among the contracts in excess of $5,000 granted by the War Supply Board, Ottawa, to Canadian rubber manufacturers during the period June 21 to July 10 were the following: for clothing, Tower Canadian, Ltd., Toronto, $136,322 and $17,860; Canadian General Rubber Co., Ltd., Galt, Ontario, $75,385 and $71,524; Kaufman Rubber Company, Ltd., Kitchener, $39,720 and $71,519; Miner Rubber Co., Granby, Quebec, $71,534; Dominion Rubber Co., $27,600; Barringham Rubber Co., Ltd., Oakville, Ont., $71,529; for technical instruments, Viceroy Manufacturing Co., Toronto, $8,234; for land transport, Goodyear Tire and Rubber Co. of Canada, Ltd., New Toronto, $18,705; Firestone Tire and Rubber Co. of Canada, Ltd., Hamilton, $44,479 and $122,704; Dunlop Tire and Rubber Goods Co., Toronto, $92,247; for personal equipment, Miner Rubber Co., Ltd., $5,160; for dockyard stores, Jos. Stokes Rubber Co., Ltd., Welland, Ont., $6,058; and for aircraft supplies, Dunlop, $21,364.

Hot Water Bottle Stoppers

Although no exact figures are available, the output of hot water bottles in England is estimated at 7,000,000 units annually. Until recently the screw-stoppers used in England for these bottles were made exclusively of galvanized sheet iron, the chief supplier of which was the British subsidiary of A. Schrader's Son, Division of the Scovill Co. Owing to the restrictions imposed by the government, however, these stoppers can no longer be delivered in quantity.

Consequently, British factories producing hot water bottles have had to find a substitute stopper. The most obvious solution was the use of hard rubber, but this was difficult because of the great number of molds necessary. The use of plastics was impossible, because most plastics in England are being reserved for army use whereas others are hygroscopic and therefore inappropriate for the purpose. The leading factory has adopted the use of stoppers made entirely of glazed porcelain. Although these stoppers are quite satisfactory, their one big disadvantage is their considerable weight.

Imports of crude rubber into the United States during July amounted to 97,081 long tons, valued at $40,321,581, an average value per pound of 18.54 cents. Government stocks at the end of July amounted to 218,844 long tons.

The Gem City Independent Union was selected by employees of the Dayton Rubber Mfg. Co., Dayton, Ohio, as their collective bargaining agent in an election last month supervised by the National Labor Relations Board.

Both the Goodyear Tire & Rubber Co. and the B. F. Goodrich Co. have begun advertising campaigns in the public press on their synthetic materials.

LOS ANGELES NEWS

Frank A. Steele, general superintendent of the local Goodyear plant, spent the latter part of August and first part of September on a trip up the Coast. He visited various outlets for Goodyear products. The trip combined business with pleasure.

Joe Wehrly, former secretary to Frank A. Steele at the Goodyear plant, now connected with the crude rubber division of Goodyear, has returned to the plant after having been stationed for some months at Wilmington. T. R. O'Brien, manager of the crude rubber division, who spent a couple of months in the Los Angeles area, has returned to the New York office. C. K. Lucas has arrived from the New York office and will act as manager of the crude rubber division on the Coast.

The new warehouse at the Goodrich plant which has been under construction for some months is scheduled for completion about October 1. Work has been somewhat delayed but is again going along nicely.

M. G. Morgan, compounding chemist at Goodrich for some time, has been transferred to the Akron plant.

C. A. Carlton, head of technical sales for J. M. Huber, Inc., spent a few days in Los Angeles late in August and then went north to the San Francisco area accompanied by Ed Royal of H. M. Royal, Inc.

Bill Haney, plant superintendent for the Kirkhill Rubber Company, and Jack Weimer, plant superintendent for the W. J. Voit Rubber Corporation, flew east on Friday, August 29, returning Monday, September 8. They were scheduled to visit Akron and New York City.

Frank Keefe of the Southwestern Rubber Company when fishing in the waters off Balboa had his mind set for catching a marlin. After a prolonged struggle with a monster which he expected to be able to talk about for all time to come he succeeded in landing it. The marlin however turned out to be a 100-pound shark. Better luck was had by all when Mr. Keefe, Karl Faulhaber of the Faulhaber Rubber Company, and George Steinbach of H. M. Royal, Inc., formed a sea-faring group a few days later and invaded the waters around Santa Catalina Island. It is reported that but few natives of the deep survived this onslaught.

W. J. Condon, superintendent of the Goodyear plant at Sydney, Australia, and wife, and E. T. Ruffner, superintendent of the Goodyear plant in Java, spent a few days in Los Angeles in August en route from their homes in the Far East to Akron.

I. D. Blumenthal, president of the Golden State Rubber Mills, Inc., was due to arrive in Los Angeles late in September to spend a couple of months. Mr. Blumenthal lives in North Carolina.

L. J. Kraft, manager of the Golden State Rubber Mills, Inc., is the extremely proud father of a daughter, Miriam Olivia, weight 8 lbs. 1½ oz., recent arrival in the "City of the Angels."

E. G. Brooks of Golf Ball Service, 3351 Glendale Blvd., Los Angeles, is back from a selling trip which took him to San Francisco and intermediate points. He says he sold enough golf balls to keep him busy manufacturing for some months to come.

Herman B. Libkind, formerly with the Royal Electric Company, Inc., is now the chief chemist for Western Insulated Wire, Inc. This company has recently doubled the capacity of its braiding department.

The first meeting of the season for the Los Angeles Rubber Group, is scheduled for Tuesday evening, October 7. A good initial program is being worked out the details of which are not yet available. Leon Horchitz (Goodrich) who took office as chairman last year continues to serve in that capacity until the first of the new year. The growth of the group in the last five years has been quite phenomenal and campaigns for enlarged membership will continue during the coming year.

Army Approves Retreading

Official approval to the benefits of retreading was given by the U. S. Army in an announcement made on August 23 to the effect that retreading and recapping of worn automobile tires had been perfected to a degree which made these processes thoroughly acceptable. Tests by the Army in a 9,000-mile convoy demonstrated that a tire recap, when properly done, gives 80% of the service of an original tread. Because there are some 4,500 retreaders throughout the country, the Army will have its repairs done by established firms rather than set up its own equipment, except in outlying districts.

All-Rubber Electrical Plug

Production of the first all-rubber, multiple-outlet electrical plug (cube tap) was recently announced by the U. S.

Rubber Co. By an unusual manufacturing method the plug is molded in a single unit and metal parts are inserted later. The plug is much smaller than conventional triple-outlets, is unbreakable, and admittedly safer. It has been approved by the Underwriters' Laboratories.

Lower Fabric Use Foreseen

Reduced production of motor cars will have considerable significance to the textile industry during the war period, with a substantial decline indicated in the quantities of cord fabric for tires and sundry sheeting and upholstery goods insofar as the passenger car industry is concerned. According to figures compiled by the New York Cotton Exchange Service Bureau, consumption of all cotton in mills in the United States during 1940 amounted to 8,058,000 bales of which 806,335 bales were used in the making of tires, passenger cars and trucks. The Bureau reports that 59,352,643 tires were produced in 1940, consuming a total of 286,079,739 pounds, an average of 4.82 pounds of cotton fabric per tire. Figuring 58,594,645 pounds to compensate for tare and waste loss in conversion from baled raw cotton into cotton fabrics, the automotive tire industry consumed a total of 344,674,384 pounds of cotton, on a gross weight basis, in 1940.

Naugatuck Plant Started

Ground was broken on September 8 for the new synthetic rubber plant to be erected at Naugatuck, Conn., by the U.S. Rubber Co. The plant is to be built under an agreement of lease between the rubber company and the Defense Plant Corporation. It is one of four recently authorized by the Reconstruction Finance Corporation. The plant will have a capacity of approximately 10,000 tons per year. F. B. Davis, Jr., president of U.S. Rubber, and Kenneth Goodyear, descendant of Charles Goodyear, discoverer of vulcanization, participated in the ground-breaking ceremonies.

OBITUARIES

Charles A. Stillman

Charles A. Stillman, vice-president of the Goodyear Tire & Rubber Co., and the last of the officials placed with the company by Dillon, Read & Co., financial institution, when they reorganized the company twenty years ago, died at his home, 581 N. Portage Path, Akron, Ohio, on September 6 after a lengthy illness. He was 68 years of age.

Born in Tuscaloosa, Alabama, on February 5, 1873, Mr. Stillman was graduated from the University of Alabama. He first worked for a pig iron company but in 1909 he went to Chicago as secretary of the Iroquois Iron Co., later becoming vice-president and general manager of that company. He also was head of the Rober & Brown Ore Co. before joining Dillon, Read & Co.

In 1921 Mr. Stillman was sent to Akron as secretary of Goodyear. Five years later he was made a vice-president. During his tenure with the company he organized factory units for it in Australia, Sweden, England, Argentina and Brazil. He also organized the Goodyear factory at Gadsden, Alabama. He was a strong supporter of lighter-than-air craft and headed many of Goodyear's enterprises in this field.

Mr. Stillman was active in Akron's civic life serving at various times with the Better Business Bureau, Board of the City Hospital, Y.M.C.A., and the Boy Scout organization. He was a trustee of the First Presbyterian church. He was also a member of the Portage Country and Akron City clubs. Funeral services were held on September 8 with interment in Rose Hill Cemetery. He leaves a widow, son and daughter.

John E. Noonan

John E. Noonan, a leading figure in the rubber industry for forty-one years and general superintendent of the processing division of the B. F. Goodrich Company at the time of his retirement in January, 1939, died as the result of a heart attack while enjoying a game of bridge on the farm of a friend near Ghent, Ohio, on September 1. He was 71 years of age.

A native of Revere, Mass., Mr. Noonan was born in 1870, the year the Goodrich company was founded. He attended school at Chelsea, Mass., and after graduating from high school entered the rubber business. When A. H. Marks, a Revere rubber chemist, formed the Diamond Rubber Co. in Akron, now a part of the Goodrich organization, he brought Mr. Noonan along with him to take charge of the processing department of the new company. At that time Mr. Noonan was a mill and calender operator.

After arriving in Akron Mr. Noonan's career was closely linked with the growth of Goodrich. Frequently during his regime the processing division won the safety award given by the company to interplant divisions. Following his retirement in 1939, Mr. Noonan traveled extensively. He was a member of the Fairlawn Country and the Akron City clubs and a member of the fourth degree, Knights of Columbus. He leaves a widow and a daughter.

Thomas W. Gangloff

Thomas Waddell Gangloff, technical manager of the Hazard Insulated Wire Works Division of the Okonite Co., died at the age of 49 on August 10 after a brief illness in Wilkes-Barre, Penna. He was well known for his development work in rubber insulations and was active in the affairs of the Division of Rubber Chemistry, A.C.S., the National Electrical Manufacturers Association, and the Insulated Power Cable Engineers Association.

Following a technical education at Cornell and Lehigh Universities, Mr. Gangloff entered the employ of the Insulated Wire Division of the Hazard Manufacturing Co. in 1916. His first job was in the chemical laboratory but a few years later he was advanced to the position of chief chemist. When Okonite acquired the plant in 1928 he was retained as technical manager, which position he held until the time of his death.

In addition to his memberships in technical organizations, Mr. Gangloff was also a member of the Westmoreland Club of Wilkes-Barre. He leaves a widow.

B. Y. McLemore

Baskerville Young McLemore, vice-president and assistant general manager of the Elm City Rubber Co., New Haven, Conn., died at the age of 35 in his office on August 22 of a coronary thrombosis.

The son of a Southern planter, Mr. McLemore attended the University of Kentucky where he was active in football and other sports. Later, he attended the University of Alabama, finishing with an engineer's degree. He joined the Elm City Rubber Co. in February, 1932, and was with the company in various capacities until 1937 at which time he returned to the south. In July, 1940, he returned to the company as vice-president and assistant general manager, holding those positions until his death.

Mr. McLemore leaves a widow and two children, aged five years and seven months, respectively. Interment was in Greenwood, Mississippi.

Arthur B. Purvis

Arthur Blaikie Purvis, director of the British Supply Council in North America and one-time president and director of the Dunlop Tire & Rubber Goods Co., Ltd., was among those killed in a ferry plane crash at a British airport on August 14. An industrialist of wide experience, he was named by Britain to direct her huge buying program in the United States immediately after the outbreak of the war with Germany.

Born in London on March 31, 1890, Mr. Purvis was left an orphan at the age of 13 and went to work for $2.50 a week. Later he worked for some years for a shipping company and then joined the Imperial Chemical Industries as a salesman in South America and Africa, eventually heading the company's Canadian subsidiary, Canadian Industries, Ltd., as president and managing director. He was also a director of numerous American and Canadian companies engaged in various industries. A special service was held in Washington Cathedral in Washington, D. C., on August 17, in his memory, attended by his widow and son.

Franklin P. Lee

Franklin Pierce Lee, treasurer of the Archer Rubber Co., Milford, Mass., since 1907, died after a year's illness at La Jolla, Calif., on July 24. Born in Providence on September 2, 1853, Mr. Lee attended public school in Woonsocket, R. I. Before joining the rubber company he was interested in one or two machinery businesses in both Woonsocket and Milford, as well as holding an interest in a local newspaper. He was active for many years in the civic and business affairs of both towns. Mr. Lee was a Mason, Elk and Odd Fellow. Funeral services were held in Woonsocket on July 30, with interment in that town. Survivors include a daughter.

James J. Govey

James J. Govey, president of the E. J. McCormick Rubber Co., Inc., which recently moved to Ridgefield Park, N. J., died at his home in Hackensack, N. J., on August 4. He had been associated with the company since its inauguration as the Mattson Rubber Co. almost fifty years ago. Mr. Govey was born in London, England, in 1872, and received his education in that city. Funeral services were held on August 7, with interment in Greenwood Cemetery, Brooklyn, N. Y. He leaves a widow.

Joseph D'Louhy

Joseph D'Louhy, purchasing agent of the Raybestos Division of Raybestos-Manhattan, Inc., Stratford, Conn., and associated with the parent company and its predecessors for thirty-four years, died at his home in Stratford on July 26 after a long illness. He was a member of St. John's Lodge No. 8, A.F. and A.M., and of Obeh Grotto.

NEW NOVELTIES and SPECIALTIES

Thomas Rubber Stoppers

A new line of rubber stoppers, in semi-solid, one and two-hole styles, made of a bloomless, black, heat-resisting composition, was recently announced by the Arthur H. Thomas Co., West Washington Square, Philadelphia, Penna. The stock from which these new stoppers are made is said to possess great elasticity, to contain more than 70% of pure gum, to be free from surface sulfur, and to

contain less than 0.75% of free sulfur. No reclaimed rubber is used. Temperatures up to 110° C. do not visibly affect the shape, size or structure of these stoppers, which are designated as HR-108 by the company, and laboratory bomb tests are said to indicate a useful life approximately five times that of the ordinary stopper. The semi-solid and one-hole types are illustrated.

Ablo Synthetic Rubber Compound

A synthetic rubber compound, sold under the trade-name of Ablo, which finds application as a sealing, caulking, and waterproofing agent, has been placed on the market by the American Bar Lock Co., Inc., Long Island City, N. Y. It may be used for caulking around window and door frames, cracks in masonry, and chimneys; for sealing cracks in swimming pools, cellars, roofs, roads and sidewalks; for waterproofing foundations, basement walls, tiles, etc.; for installing structural glass, mirrors, marble and skylights; and for many other uses. It will not powder, become brittle, crack or otherwise disintegrate, according to the supplier. It will adhere to glass as well as other surfaces, including wood, stone, brick, concrete and metal. Ablo Synthetic Rubber Compound is supplied in cartridges or in 1 or 5 gallon cans and 55 gallon drums. It may be applied with a gun or trowel. The compound can also be furnished in a heavy paint consistency for painting, rustproofing and preserving wood, steel, canvas, etc., among other applications.

Rubber Brush Set

Attractively packaged, a set of three rubber brushes was recently introduced by the Atlas Products Co., 342 Madison Ave., New York City. The largest brush, which has rubber bristles on one side and sponge rubber on the other, gets dust, dirt and fuzz off clothing, furs, furnishings, suede-finished materials, etc., while the smaller brushes, one a replica of the larger brush and the other with only a sponge rubber surface, are satisfactory for shoes, hats and other dress accessories. The brushes are in color and are complete with suedette colored covers.

Hygieia Chalkboard Cleaner

The Hygieia Chalkboard Cleaner, a new type of blackboard cleaner which entirely eliminates all washing of slate, glass or composition boards, was recently introduced by the American Crayon Co., Sandusky, Ohio. The new cleaner is a plastic holder which fits the hand comfortably, a reversible cleaner being inserted in it. One side is of Airfoam, the cellular latex developed by Goodyear, which obliterates the chalk marks from the board, and the opposite side is of lambskin, which cleans the board, actually removing every vestige

of chalk dust with one stroke. American Crayon recommends that the latex side be used during the day and the lambskin side for dressing down boards at the end of the day. Cleaner refills are available.

Superman Inflatable Toy

The Superman inflatable rubber toy was recently introduced by the Oak Rubber Co., Ravenna, Ohio. An excellent image of the nation's ace comic strip hero, the toy is made of a

heavy grade of rubber in pure white, with the figure imprinted in red and blue, producing a pleasing patriotic color scheme. The toy is fitted with a handy rubber plug in one foot for inflating and deflating. Oak Rubber is also featuring Superman toss-up balloons and prints.

"Handi-Mitt" Utility Gloves

"Handi-Mitt" Utility Gloves, made of light-weight silk and koroseal-treated to make them waterproof, acid proof, fire resistant, and grease and dirt proof, have been added to the housewares line of the Keko Products Division of Kennedy Car Liner & Bag Co., Shelbyville, Indiana. They are being merchandised as a hand protection while gardening, driving, for general housework, rainwear and while caring for infants. Stains are removed from the gloves by wiping off with a damp cloth. The company also features a line of koroseal-treated food bowl covers and other items.

Seiberling Latex Novelties

Seiberling Latex Products Co., Barberton, Ohio, recently introduced several new colorfully decorated, cellophane-wrapped latex toys to sell at 10 cents each. These include a baby doll, baby chick and Santa Claus, each in the stand-up style, with sound, and a rabbit and puppy, both in sit-up style, with sound. The new novelties range from 3¾ to 4½ inches in height. The sales department reports a keen demand from the retail trade on the new numbers.

Red Devil Vacuum Lifters

Vacuum cup holders, or lifters, under the trade name of "Red Devil," have been introduced by Landon P. Smith, Inc., Irvington, N. J. The device, which is capable of holding as

much weight as a strong man can lift, is equipped with a rubber vacuum disc, or cup, and literally puts a handle on all kinds of glass, as well as marble, granite and various smooth-surfaced articles whose weight normally makes lifting, pushing, raising, lowering or carrying awkward and difficult. Red Devil vacuum cup holders come in three models with chromium-finished body and 5/16-inch thick base of tough, durable rubber. The amply sized swivel handle with rubber grip is designed for easy carrying in any position. The models come equipped with 4, 6 and 7-inch discs, respectively.

Nairn Tub Moulding

Nairn Tub Moulding, a specially designed rubber fillet strip of sponge rubber, faced with solid rubber to provide a permanent, watertight, decorative and sealing joint around bath tub and wall, has been introduced by Congoleum-Nairn, Inc., Kearny, N. J. The moulding, primarily designed for use with the company's Nairn Wall Linoleum, is flexible, will follow the contour of the tub, and will accommodate normal seasonal movement between tub and wall without breaking the seal. Its flexibility makes continuous one-piece installations easy, and it may be used from one end of the tub joint to the other without any cutting, except for a small notch at the sharp right angle.

Hewitt Smooth Bore Hose

Hewitt Rubber Corp., Buffalo, N. Y., recently introduced a new line of smooth bore hose made possible through the use of synthetic, oil-proof rubber which will not swell or slough off and which will not discolor petroleum products. For regular continuous suction and discharge service, Hewitt Cargo and Dock hose is built with two spirals of spring steel reinforcing wire imbedded within the hose wall. For normal discharge and moderate suction service, as in barge loading, a slightly lighter construction of the same basic design is available. In both cases ends are enlarged, nipples are built in, heavily reinforced and permanently sealed against leakage with the patented Dura-Bond process. No external clamps are needed. A concealed, braided wire cable welded to the spiral of wall reinforcement wire and to the nipple at each end of the hose assures positive static dissipation.

Red Wing Air Hose

Red Wing Air Hose, designed especially for heavy duty pneumatic tool service, has been introduced by the Goodyear Tire & Rubber Company, Akron, Ohio. It is comprised of three principal components. The tube is of non-porous rubber, resistant to action of hot and cold air. Lubricants in the air will not cause swelling or flaking, obviating clogging of tools with rubber particles. Reinforcement is provided with three plies of multiple-braided, special cabled cotton yarn, providing a high safety factor for working pressures and high resistance to blows and impacts. The cover is a heavy gauge of soft red rubber with a high tensile strength, providing utmost resistance to cutting from rocks, ore, or other materials. It likewise is abrasion and sun-resistant. Red Wing air hose is available in ½-inch, ¾-inch and 1-inch sizes.

Round-Tex Belting

Round-Tex Belting, a new kind of round belting now being manufactured exclusively for the Sudbury Laboratory, South Sudbury, Mass., has been introduced. It is built on a tightly-wound steel spring as a base. The spring is covered with tire-tread stock, which acts as a cushion and protects the next coating, which is a layer of durable braid, from chafing on the spring. The braid acts as a shock absorber for the spring, controls the amount of elongation of the finished belt, and regulates its tension. The braid is then covered with tire-tread rubber which gives the belt further protection and assures long-wearing qualities. On light drives, the new belt can be used in place of ordinary V-belts.

Thermaire Shock Mattress

The Thermaire Shock Mattress for hospitals and sanitariums has been introduced by the Thermaire Equipment Co., Nashville, Tenn. The new mattress, which is made for the company by the K & W Rubber Co., Delaware, Ohio, is 30 inches wide, 74 inches long and 4½ inches thick, inflated with heated saturated air. It is thermostatically controlled and plugs into any 110-volt outlet. Portable, weighing only 38 pounds, it will support 1,000 pounds. It is vulcanized in one complete seamless unit.

New Pliofilm Products

A number of new products made from Pliofilm, the rubber hydrochloride developed by the Goodyear Tire & Rubber Co., have made their appearance lately. These include the following:

"Glamor Glove," manufactured by Josline, Inc., Hollywood, California, the palm of which is lined with a hand cream which serves as a beautifying aid. The glove protects and beautifies the hands during household tasks and is also being accepted in the industrial field by beauty operators, laundry workers, and in other occupations where women are likely to stain their hands.

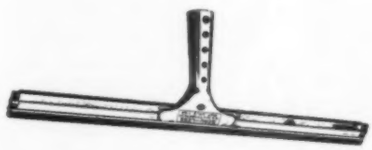
"Mother and Daughter" aprons, made by Protex Products Co, Jersey City, N. J. The aprons, which have trimmings of red and white stripes on blue, are counterparts in every respect but size. Being transparent, the aprons protect but do not hide pretty frocks and dresses.

"Mil-O-Seal" meat loaf wraps. These wraps, converted from Pliofilm, are said to provide a solution for one of the meat packing's major problems, *i.e.*, weight shrinkage of the packaged products. Average weight shrinkage of packaged meat, regardless of the type of wrapper heretofore used, varied between 8 and 10% of the total weight. Mil-O-Seal wraps are said to have reduced this percentage to less than 1%.

"Scru-Less" Window Squeegee

The "Scru-Less" Window Squeegee, a one-rubber squeegee so constructed that it has the effect of two or more rubbers, was recently developed by the W. E. Kautenberg Co., Freeport,

Ill. The rubber has two ribs on each side, one set of ribs to slide in the grooves provided in the frame and the other set of ribs to rest on the edge of the frame. The ribs in the frame keep the rubber from pulling forward at any point, a general source of trouble where screws are used. The ribs resting on the edge of the frame act like a cushion rubber, giving increased resistance as the rubber is flexed back.



All four edges of the rubber are usable. The handle of the squeegee is made of heavy sheet metal.

BIBLIOGRAPHY OF RUBBER LITERATURE for Years 1935—1939

***Compiled by* D. E. CABLE, Ph.D., Ch.E.**

•

This bibliography is the only book of its kind available in the rubber industry. Its primary object is to assemble all rubber references, stripped of abstracts or annotations, but giving sufficient directions to permit the reader to locate the original articles (and translations and reprints) or alternatively one or more abstracts of those articles.

In other words this bibliography serves as the "clearing house" for all published information on every branch of rubber technology, manufacturing processes, cultivation, machinery and equipment, new rubber articles, latest compounding materials, etc.

The subject matter is divided into separate appropriate classifications, supplemented by complete author and subject indexes which make it a simple matter to locate any single article or all that has been published on any particular subject.

The Bibliography of Rubber Literature was first brought out in 1936 covering the year 1935; the second issue, covering 1936, was included as a section of the 1937 Rubber Red Book and is now available as a separate cloth bound volume; the third issue, covering 1937, was issued in 1938. The fourth volume, covering 1938 and 1939, is a volume of over 250 pages and follows the same satisfactory style of previous issues. This edition inaugurates the issuance of the bibliography as a biennial. It will hereafter appear every other year and will cover the literature of the previous two years.

A complete set of Cable's "Bibliography of Rubber Literature" is indispensable to rubber libraries, chemists, physicists, engineers and all others desiring to keep posted on rubber developments throughout the world.

Prices (in Cloth Binding)
Volumes I, II, III .....$2.00 each
Volume IV 4.00

Published by

THE RUBBER AGE
250 West 57th St., New York City

Stamford Neophax Vulcanized Oil

(REG. U. S. PAT. OFF.)

For Use With Neoprene

THE STAMFORD RUBBER SUPPLY CO. STAMFORD CONN.

Makers of Stamford Factice Vulcanized Oil Since 1900

ROBERT BADENHOP CORPORATION

•

CRUDE RUBBER

GUTTA PERCHA
LIQUID LATEX

GUTTA SIAK
BALATA

•

WOOLWORTH BLDG. (TEL. CORTLAND 7-6920) NEW YORK, N.Y.

AN APPROVED CLAY

CROWN CLAY

SOUTHEASTERN CLAY COMPANY

AIKEN, SOUTH CAROLINA

INTERNATIONAL PULP CO., *41 Park Row, New York, N.Y.*

SOLE PRODUCERS OF PURE **ASBESTINE** SPECIALLY PREPARED FOR USE IN RUBBER

Covered and Protected by Letters Patent Registered at U. S. Patent Office, Washington, D. C.

LIBERAL WORKING SAMPLE FURNISHED FREE

ERNEST JACOBY & CO.

Crude Rubber — *Liquid Latex*
Crown Rubber Clay — *Carbon Black*
Rubber Chemicals — *Rubber Colors*

Stocks of above carried at all times

BOSTON - 79 Milk St. - MASS.

Cable Address: Jacobite Boston

SOFTENERS and PLASTICIZERS
For RUBBER
From the Pine Tree

ROSIN OIL
PINE TAR
BURGUNDY PITCH
GALEX a non-oxidizing RESIN

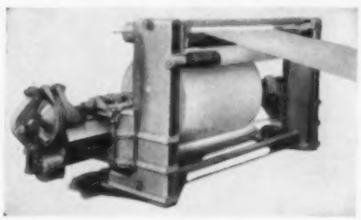
Send for "Pine Tree Products" *Booklet*

NATIONAL ROSIN OIL & SIZE CO.
R. K. O. BUILDING, RADIO CITY, NEW YORK, N. Y.
Plant: Savannah, Ga. Branches in Principal Cities
"PIONEERS OF THE INDUSTRY"

NEW EQUIPMENT

Uniform Tension Unwinders

Positive means for assuring continuous uniform tension on a web of material being unwound from a parent roll, including rubber and rubberized fabrics, is said to be provided in a new unwinding device equipped with automatic hydraulic brakes developed by the Johnstone Engineering & Machine Co., Downingtown, Penna. Known as the Johnstone Uniform Tension Unwinder with Auto-Hydraulic Brake, the device is said to ensure constant, uniform tension

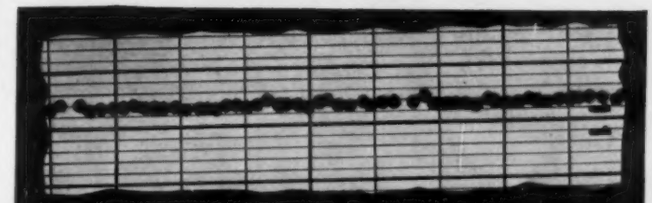


under all conditions, regardless of the speed or diameter of the roll being unwound. Aside from the specially developed brake, everything is basically the same in the new unwinder as in machines which have been built for years, except for the fact that the various parts have been redesigned and modernized.

The air cooled unwinder and its larger, heavier mate, the water cooled unwinder, consist principally of a nerve roll and hydraulic brake, automatically operated and coordinated by means of a "tensioneer." Uniform tension on the web is assured at all times because the brake controls the unwinding roll and the physical condition of the unwinding roll controls the brake. When the pull is strong, more brake friction is applied. No attendance or adjustment is required. The nerve roll operates in a loop in the travelling web of unwinding material. It is roller bearing mounted in horizontal tracks to permit free lateral movement, forward and back, yet always parallel with the other rolls in the machine. Springs or weights regulate the pull of the nerve roll against the loop of the web and this adjustable pull controls the tensions which will be uniformly maintained on the web.

The hydraulic brake which controls the speed of the unwinding roll is automatically operated by the "tensioneer," the amount of friction applied or released being determined by the nerve roll. The "tensioneer" consists of a differential reduction gear which interprets the movement of the nerve roll and transmits it to the master bellows. Copper tubing connects the master bellows with the relay bellows at the brake. The relay bellows engages a roller bearing mounted lever and eccentric which, in turn, engages the free member of the disc type brake, the fixed member being bolted to the frame of the unwind stand. The slightest tension variation of the web instantaneously causes more or less hydraulic pressure on the brake, which immediately compensates for the variation and maintains the tension uniform. The brake is so sensitive that 1½ pounds tension on the web will produce a pressure of 1200 pounds on the brake.

The air cooled type unwinder handles rubber, rub-



Baker's Controlled Temperature* supplies what Neoprene Compounders demand:

a **CALCINED MAGNESIA** *that is always* **UNIFORM**

*Temperature chart above shows unvarying temperature (never more than 5° variation) in the special, custom-built electric ovens that manufacture Baker's Light Calcined Magnesia. This is the major reason for:

1 **UNIFORMLY** GOOD WETTING POWER AND EASE OF INCORPORATION.

2 **UNIFORM** DISPERSION with IMPROVED STABILIZING EFFECT.

3 **UNIFORM** QUALITY—that is maintained in MOISTURE PROOF PACKAGING.

These are qualities Neoprene Compounders *must* have in a Calcined Magnesia. They are qualities you *get* in Baker's Light Calcined Magnesia. Baker, in many years of producing purity products to definite physical and chemical specifications, has learned the art of *exactness* and of manufacturing to small tolerances.

Strong, 4-ply bags, asphalt-interlined and tape-sealed—and corrugated, waterproof cartons—guard against moisture infiltration.

More than that, Baker has gone a step further to safeguard delivery of *uniform* Calcined Magnesia. Moisture-proof packages bring you this product with its uniform quality *maintained.*

Investigate Baker's Light Calcined Magnesia—manufactured especially for the exacting needs of Neoprene Compounders. Test it in wetting power—in ease of dispersion—stability of compounded stock—rate of cure—tensile strength and plasticity. Learn why Baker's Light Calcined Magnesia is better. Send for free samples.

J. T. BAKER CHEMICAL CO.
Phillipsburg, N. J.

Baker's *Light*
CALCINED MAGNESIA
(MAGNESIUM OXIDE)

There's Always a *Priority* on Time-Proven Reliability!

America's magnificent industrial production lines have gone all-out for Defense . . . and upon no industry has the defense burden fallen more heavily than upon the rubber and plastics processors.

The C. P. Hall Company is proud that in these days of critical demand, its compounding materials, proven through 22 years of research and industrial experience, are helping the greatest plants in rubber to speed production and maintain top quality in the face of emergency.

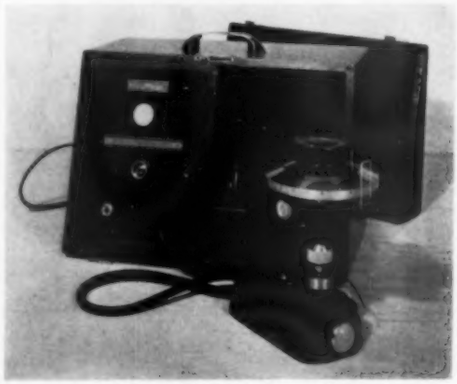
★

The C. P. Hall Co.
CHEMICAL MANUFACTURERS
AKRON • BOSTON • LOS ANGELES • CHICAGO

berized fabrics, light and medium weight papers, fabrics, imitation leathers, etc., used in converting, waxing, coating, embossing, printing, etc. Standard size machines take rolls 32, 42, 52 and 62 inches wide. Speed depends on the material handled and width of roll, maximum being 700 f.p.m. The water cooled type handles the same weights of papers and other materials as the air cooled type and for the same purposes, except that it will also handle boards up to 20 points thick and correspondingly heavier other materials.

Carson Rubber Micrometer

A new instrument—the Carson Rubber Micrometer—which makes it possible to measure soft or compressible materials with the same degree of precision and accuracy obtained with precision measuring in-



struments on steel parts by elimination of contact pressure in measuring thickness, has been introduced by the Instrument Specialties Co., Inc., 237 Bergen Boulevard, Little Falls, N. J. The new instrument consists of a precision micrometer head fitted with a large diameter dial and mounted in a rigid frame. When the micrometer tip is brought into contact with

ADVERTISEMENT

For greater resistance to heat, Madame should use HYCAR.

See page 435

a metallic rider resting on the work, exact instant of contact is indicated by a green light before any pressure is exerted on the piece being measured. This is made possible by a special electronic circuit operating on a new "currentless contact" principle, sensitive to displacements as small as five millionths of an inch.

The Carson Rubber Micrometer is available with a variety of special fittings and attachments for specific measuring problems on paper, plastics, cork, fibre, leather, felt, insulated wire and textiles, in addition to rubber. Two standard dials are available, a 2½-inch diameter dial with divisions for every tenth of a thousandth inch and a 4½-inch diameter dial with divisions for every half a tenth. The larger dial has a vernier or fine adjustment permitting accurate adjustments to a fraction of the divisions. The instrument is portable and operates from any 110 volt 60 cycle current supply.

Attachments to the micrometer can be supplied to produce unit measuring pressures specified in A.S.T.M. standards or any measuring pressure from 10 milligrams up as desired. The attachment shown in the accompanying illustration is for testing rubber thickness and provides sufficient weight to hold the specimen flat against the table without appreciably compressing the section being measured. The same attachment gives precision readings on thin tissue paper, textiles, fabrics or flexible sheet materials, readily repeating and accurate to twenty-five millionths of an inch.

Cambridge Fabric Permeater

An accurate, rapid and convenient means for production testing of the permeability of fabrics which are to be inflated with hydrogen, helium, carbon dioxide, etc., is found in the Fabric Permeater, a new instrument developed and introduced by the Cambridge Instrument Co., Inc., Grand Central Terminal, New

York City. The rate of permeation through the fabric is quickly determined by equipment utilizing the thermal conductivity method of gas analysis and is indicated in terms of "liters per square meter per 24 hours" of the retained gas. The instrument determines the rate of diffusion of hydrogen and other gases through balloon fabrics and other materials, and it enables a testing of the effectiveness of various dopes with which the fabrics are treated. Lateral diffusion as well as leakage at seams can be determined by the use of this instrument.

In operation, the sample to be tested is clamped between two recessed test plates, thereby forming

BAIRD

MANUFACTURERS' CRUDE RUBBER PURCHASE CERTIFICATES

▲

• Our long experience since 1903, together with our friendly relations with our old and new customers ideally equips us for the prompt, efficient and thoroughly satisfactory handling of **Manufacturers' Crude Rubber Purchase Certificates.**

• We shall continue to appreciate and respect the business of our old friends and assure the new ones that their orders will be handled with courtesy and efficiency . . . . . .

▲

BAIRD RUBBER & TRADING CO., Inc.
WOOLWORTH BUILDING
233 Broadway New York

BArclay 7-1960

WILLIAM T. BAIRD, JR. COLLIER W. BAIRD
HAROLD W. HOLCOMBE DENIS P. MOCHARY

HARMON COLORS
for RUBBER MANUFACTURE

- *Are Bright in Shade*
- *Fast in Cure*

Made by a new patented solvent process in a new form—

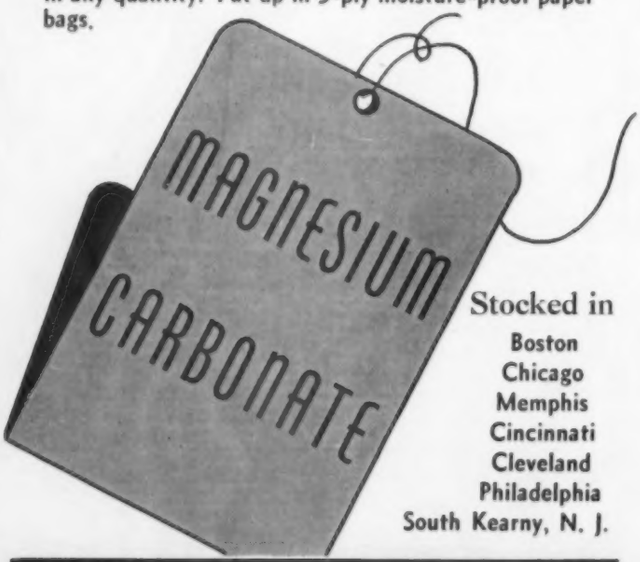
ORGANIC RUBBER COLOR GRANULES

- *Easy to weigh* • *Easy to disperse*
- *Economical* • *Will not dust or fly*

HARMON COLOR WORKS, INC.
PATERSON, N. J.
Los Angeles Agent
Roberts-Davis Co., 1104 N. Detroit St.
"Harmon-ize With Harmon Colors"

UNIFORM QUALITY
POWDERED

Ample stocks, conveniently located. Quick deliveries in any quantity. Put up in 5-ply moisture-proof paper bags.



Stocked in
Boston
Chicago
Memphis
Cincinnati
Cleveland
Philadelphia
South Kearny, N. J.

WHITTAKER, CLARK & DANIELS, INC.
260 West Broadway
New York City

upper and lower compartments separated by the fabric being tested. The plates are designed so as to keep the fabric from sagging and thus ensure identical volumes of the two compartments. Hydrogen is passed into the lower compartment, while the upper compartment, which is filled with clean dry air, communicates with the metering unit. The hydrogen which permeates through the fabric contaminates the air in the upper compartment and thus changes its thermal conductivity. A measure of the rate of this contamination provides a measure of the ability of the fabric to hold gas. The metering unit in the test plate assembly is connected through a control box to a portable spot galvanometer, calibrated to read directly in hydrogen leakage in "liters per square meter per 24 hours."

To prevent leakage of the gas along the layers of textile, and to determine accurately the area being tested, the sample is prepared for the test by being clamped between two co-axial metal discs and the edge dipped into a hot sealing mixture. These "waxing" discs may be seen in the foreground of the accompanying illustration.

Manufacturers of fabric for lighter-than-air-craft, life rafts, life jackets, gas masks, and other products involved in national defense, as well as rubber manufacturers and producers of lacquers and chemicals for impregnating textiles, are of course especially concerned with fabric permeability and will find the Fabric Permeater of special benefit. The instrument, however, has many ordinarily commercial applications, such as determining the quality of coverings for tennis balls or the suitability of new materials for packaging tobacco products, foodstuffs, etc.

A new and more convenient method of using **Hydrion pH Test Papers** throughout the range pH 1 to 14 is said to be provided in a vest-pocket size plastic dispenser introduced by R. P. Cargille, 118 Liberty St., New York City. The dispenser holds and seals two 15-foot rolls of test paper.

ADVERTISEMENT

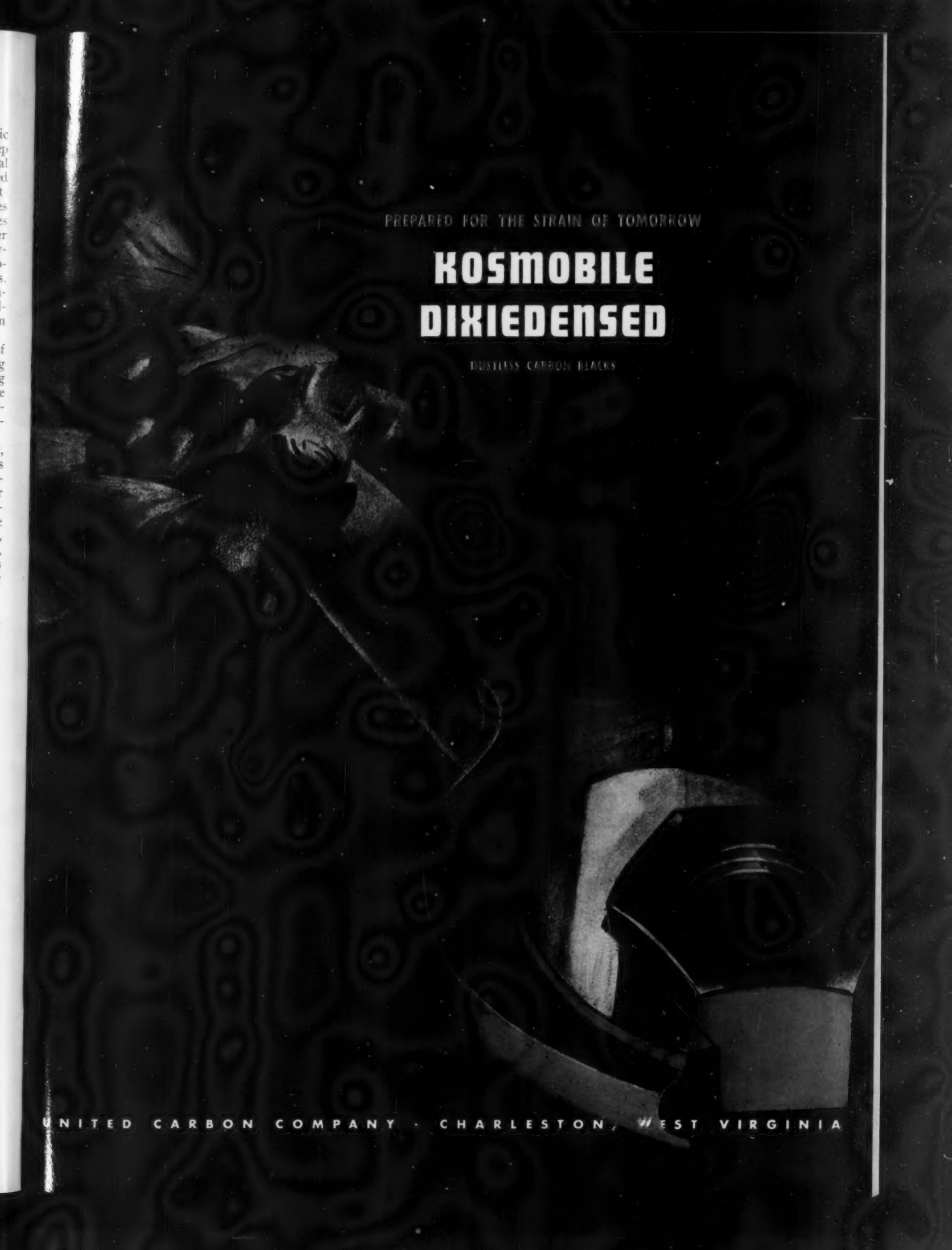
For greater resistance to the effects of aging, Madame should use HYCAR.

See page 435

PREPARED FOR THE STRAIN OF TOMORROW

KOSMOBILE DIXIEDENSED

DUSTLESS CARBON BLACKS



UNITED CARBON COMPANY · CHARLESTON, WEST VIRGINIA

KOSMOBILE AND DIXIEDENSED STAND FOR THE HIGHEST DEVELOPMENT IN BLACKS FOR RUBBER COMPOUNDING. THEY ASSURE PRODUCTS THAT ARE WELL PREPARED FOR THE STRAIN OF TOMORROW.

REVIEWS

BOOKS

Industrial Plastics (Second Edition). By Herbert R. Simonds. Published by Pitman Publishing Corp., 2 West 45th St., New York City. 6 x 9 in. 385 pp. $4.50.

The publication of this second edition of "Industrial Plastics" so soon after the first is indicative of the rapid progress being made in and with plastics. Like the first, it treats with the derivation, manufacture, use, and possibilities of the wide range of plastics now commercially available. The chapter on "Future of Plastics" has been extended to include a section on Plastics in Wartime, in which attention is given to the use of plastics in planes and their parts, bomb fins, bullet-proof composite plates, submarine battery holders, machine gun carriers, cartridge shells, etc.

All tables and statistics have been brought up-to-date in this second edition and most of the charts have been redrawn to include the latest available information. The chapter on chemistry has been largely rewritten and many formulae have been revised in light of recent research. Material has been added concerning types of plastics developed since publication of the first edition, and brief comment is made about the new fibers and bristles. Reference to rubber, synthetic rubber and rubber-like materials is made in the chapter on "Other Plastics and Borderline Materials." Mention is also briefly made of the use of rubber coatings on metal inserts in compression molding.

The book has fifteen chapters in all, the last of which lists the trade name, type and manufacturer of all known plastics, the limits for the list being American plastics, synthetic plastics, commercially active plastics and cold molded materials of plastics type. There is also a comprehensive index. Since the field of utilization for plastics ranges from ash trays to xylophones, this book is a helpful treatise for everyone concerned with plastics, from producer to consumer.

•

Symposium on Color—Its Specification and Use in Evaluating the Appearance of Materials. Published by American Society for Testing Materials, 260 So. Broad St., Philadelphia, Penna. 6 x 9 in. 86 pp. $1.00, paper cover; $1.25, cloth binding.

Sponsored jointly by the Inter-Society Color Council and the A.S.T.M., this symposium, held at Washington, D. C., on March 5, 1941, stresses the importance of adequate specifications for color and discusses the use of color in the testing and evaluation of materials.

Following the "Introduction to Color" by Deane B. Judd, who covers the attributes of colors, and the distinction between the psychological definition of color and the technical definition, there is a paper on "Color Specifications of Transparent Materials" by Francis Scofield, who reviews critically the various sets of standards. R. H. Sawyer, whose paper covers "Hiding Power and Opacity", discusses the most significant theoretical and empirical relations which have been developed and those practical testing methods which have attained widest recognition.

"Color Standards for Opaque Materials" is the subject of I. H. Godlove's paper, who points out that material standards may vary from haphazard and variable traditional objects which lead to unprecise color names, to groups of standards such as the Ostwald and Munsell systems. The two closing papers deal with the practical problems of color testing, one by A. E. Parker, entitled "Spectrophotometry and Color Evaluation", and the other by R. S. Hunter covering "Photoelectric Tristimulus Colorimetry."

RANDALL & STICKNEY

Hand Grip Rubber Gauge No. 3-B

Height .....9" Length .....9¾" Range .....½"
Depth of Throat ....6½" Dial 50 Divisions Each Div. 1/1000" Weight .... 4 lbs. Frame . Aluminum

Designed for gauging stock as it is coming from the calender.

FRANK E. RANDALL, Waltham, Mass.

NEVILLE

Coal-Tar Chemicals

for the RUBBER INDUSTRY

Coumarone Resins
All Grades

Resinous Oils
X-1
X-105

Solvents
Refined Benzols
Crude

Softeners
Soft Resins
X-1

Dispersing Oil
Nevoil

Tack Producers
Soft Resins
X-1

Reclaiming Oils
X-1
X-159
Also Solvents for Reclaiming

Prices, samples and information gladly furnished

R-2

THE NEVILLE COMPANY
PITTSBURGH • PA.

Write for this
COMPLETE
CATALOG ON

Stearns MAGNETIC
CLUTCHES AND BRAKES
CLUTCH - BRAKE COMBINATIONS

Offer definite savings in operating costs and maintenance expense, provide efficient power transmission with near or remote control. Smooth acceleration with fast and positive stop. What's your problem? We invite your inquiry. No obligation. Write for Bulletin 225.

STEARNS MAGNETIC MFG. CO.
640 So. 28th St. Milwaukee, Wis.

COLORS for RUBBER
Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides
•
Reinforcing Fillers
and Inerts
C. K. WILLIAMS & CO.
EASTON, PA.

ZOPHAR

WAXES and COMPOUNDS
• For blending in molded rubber goods. Wax hardeners and softeners and waxes to be used as lubricants to prevent tackiness while rubber is being worked or to prevent adhesion to molds.
Our laboratories and wax experience are at your command to solve your problems.
ZOPHAR MILLS, Inc.
110-26th ST. BROOKLYN, N. Y.
FOUNDED 1846

RMP ANTIMONY
• ATTRACTIVE
• NON-DETERIORATING
for RED RUBBER
RARE METAL PRODUCTS CO.
BELLEVILLE, N. J.

REVIEWS (CONT'D)

New Encyclopedia of Machine Shop Practice. Edited by George W. Barnwell. Published by Wm. H. Wise & Co., 50 West 47th St., New York City. 5½x8½ in. 576 pp. $1.98.

Designed for popular use in factory reference libraries, schools, vocational courses and especially for home study, this new book answers thousands of questions about modern metal working operations. Although encyclopedic in content and copiously indexed for ready reference, with approximately 2800 items listed, the text is written in clear and concise descriptive form. The editor, who is Professor of Production Practice at the Stevens Institute of Technology, made the language plain, understandable by the layman, and avoided deep technicalities and difficult mathematics.

Included in the contents are detailed explanations of the operation of such standard machine tools as the lathe, milling machine and centerless grinder. Gear cutting, heat treatments, forge and foundry work are also covered. Methods of laying out work in the shop, blueprint reading, the construction, theory and use of the micrometer, as well as various types of gauges and the principle of working to limits, also are clearly detailed. Many of the machine tool operations discussed bear directly on production problems involved in the National Defense Program.

•

Directory of New England Manufacturers: 1942. Published by George D. Hall Co., 30 Kilby St., Boston, Mass. 8 x 10½ in. 752 pp. $15.00, through September, 1941; thereafter, $25.00 per copy.

This latest guide book to one of the richest industrial regions in the United States has been completely revised and brought up-to-date. Like previous editions, it contains four sections: (1) An alphabetical list of all manufacturers in the New England area, with officers, products, number employed, branch offices, and other data shown; (2) A geographical section, with each state in the area treated individually, cities and towns of each state being arranged alphabetically; (3) A product section, in which thousands of product classifications are shown in alphabetical order; (4) A brand name section, listing the brand or trade names of all products made in the area. According to the compilers, a total of over 18,000 changes, corrections and additions were made to bring the latest edition up-to-date.

BOOKLETS, CATALOGS, Etc.

Water Resistance of Neoprene Compositions. (Report No. 41-2). By D. F. Fraser. Rubber Chemicals Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware. 6¼ x 9½ in. 16 pp.

Like rubber, neoprene is classed as a water resistant material. However, the water resistance of neoprene vulcanizates is affected to a greater extent than rubber by the type of compound employed. This laboratory report first discusses the theory of water absorption in general and then discusses the effect of the type of neoprene, as well as metallic oxides and modifying agents, fillers and softeners, cure, time and temperature of immersion, and of other immersion media on water resistance. Charts showing the effect of various fillers on the water absorption of Neoprene Type E stocks at 100° C. and the effect of various softeners on water absorption at the same temperature are included. The effect of temperature on water absorption is also shown in chart form. A composition which has excellent resistance to water and anti-freeze solutions is given.

Conserving Men, Money, Materials in Essential Industries. Welfare Division, Metropolitan Life Insurance Co., 1 Madison Ave., New York City. 5¼ x 7¾ in. 16 pp.

This report emphasizes the need for more effective accident controls in order to conserve men, money and materials, especially important in times like these when industry is confronted with emergency production demands. It is basically a discussion check list for the industrial executive concerned with emergency production. Particular stress is laid on the proper consideration of accident costs. As an aid to the study of industrial accidents and to point up proper means for their control, the report briefly develops several fundamental considerations for employee safety.

•

Modern Hydraulic Presses. Hydraulic Press Division, French Oil Mill Machinery Co., Piqua, Ohio. 8½ x 11 in. 20 pp.

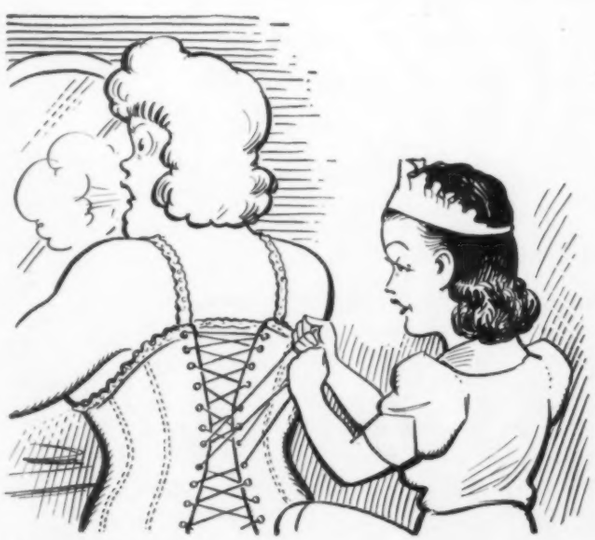
Consisting of a number of photographic reproductions of presses of the company's manufacture in actual operation at various plants, including several rubber plants, with each reproduction accompanied by brief descriptive text, this catalog represents a record of accomplishment in the increasingly important development of hydraulic presses and hydraulic press equipment. The catalog includes a table of circumferences and areas of circles. Also included is data on tons pressure on given ram diameters and given line pressures.

•

Handbook of White Pigments. (4th Edition). Krebs Pigment & Color Corp., 1007 Orange St., Wilmington, Delaware. 8½ x 11 in. 28 pp.

This latest edition, considerably enlarged over previous editions, contains a complete compilation of facts and data on all of the Krebs white pigments, including titanium dioxide, extended titanium pigments, and lithopones. Physical and chemical characteristics and recommended fields of use are described, as is also the interrelationship between the various grades of pigments, which may facilitate simplification of formulation. A special index to uses is of considerable value to the user of the handbook.

ADVERTISEMENT



Madame should use HYCAR.
It doesn't swell.

See Page 435

40% LATEX
60% LATEX
REVERTEX

73-75% CONCENTRATED

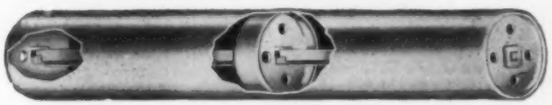
Compounds tailored to your special requirements

Technical Service is at your Disposal without charge or obligation

•

REVERTEX CORPORATION OF AMERICA
37-08 Northern Blvd., Long Island City, N. Y.

New and Better
GAMMETER'S
ALL STEEL ALL WELDED
CALENDER STOCK SHELL



4" - 5" - 6" - 8" - 10" - 12" diameters, any length.

Besides our well known Standard and Heavy Duty Constructions, we can supply light weight drums made up to suit your needs.

THE W. F. GAMMETER COMPANY
CADIZ, OHIO

The CARTER BELL MFG CO

Springfield New Jersey

MARKETS

Rubber – Crude, Reclaimed and Scrap – Cotton – Ducks – Tire Fabrics – Sheetings

NEW YORK, SEPTEMBER 9, 1941

Crude Rubber

WITH the rubber futures market on the Commodity Exchange closed, business in the outside market was virtually at a standstill for the past several weeks. The trade is anxiously awaiting the result of the series of conferences which have been held in Washington between members of the Rubber Reserve Company and executives of the Rubber Trade Association of New York. Various phases to be adopted before the Government's program fully begins to function are being discussed at these conferences, including the minimum service charge dealers and importers will charge factories and other rubber consumers. Little activity is anticipated in the market until minimum service charges have been established and until the date when the Rubber Reserve Company will begin to sell its rubber is set. As far as the Commodity Exchange is concerned, a special committee is now attempting to uncover the best possible method by which contracts still outstanding will be liquidated. There has been some inquiry for Para rubber recently but supplies in this country are tight and importers advise that only small lots are available for shipment from Brazil. Quotations in the outside market follow:

As of September 9

Plantations—

Ribbed Smoked Sheets—

No. 1 Spot	—	@	.22½
September	—	@	.22¾
No. 2	—	@	.22¼
No. 3	—	@	.21⅞
No. 4	—	@	.21¾
Thin Latex Crepe	—	@	.24
Thick Latex Crepe	—	@	.24
Brown Crepe, No. 1	—	@	.21
Brown Crepe, No. 2	—	@	.20¾
Amber Crepe, No. 2	—	@	.21
Amber Crepe, No. 3	—	@	.20¾
Brown Crepe, Rolled	—	@	.18½

Latex—

Normal, per lb., carload lots	—	@	.27½

Paras—

Up-River, fine	.31	@	.32
Acre Bolivian, fine	.31	@	.32

Balata—

Brazilian block	—	@	.13

LONDON MARKET

(London Cable Temporarily Discontinued)

Scrap Rubber

The demand for scrap continues at the high level set in recent months, but fortunately stocks are moving freely and dealers are able to meet the unprecedented needs of the industry. Prices have increased slightly on auto tire peelings and on inner tube stocks since our last report. Dealers are said to be doing everything possible to keep prices down to normal levels. Current quotations follow:

(Prices to Consumers)

Auto tire peelings	ton 32.00	@	33.00
Mixed auto	ton 16.50	@	17.00
Beadless tires	ton 22.00	@	23.00
Clean solid truck tires	ton 37.50	@	40.00
Boots and shoes	ton 28.00	@	30.00
Arctics, untrimmed	ton 24.00	@	26.00
Inner tubes, No. 1	lb. .11	@	.12
Inner tubes, No. 2	lb. .07	@	.07¼
Inner tubes, Red	lb. .07⅜	@	.07⅞

Reclaimed Rubber

With the rubber manufacturing industry operating at near-capacity and with the curtailment program still in effect, demand for reclaim naturally continues unabated. Heavy demand from all branches of the industry is reported by reclaimers. This situation is expected to continue for some time to come and reclaimers have set their plans accordingly. Prices have increased slightly on No. 2 Compounded Tube stocks. Current quotations follow:

Shoe

Unwashed	lb. .07	@	.07¼

Tube

No. 2 (Compounded)	lb. .10½	@	.13¼
Red Tube	lb. .12	@	.12¼

Tires

Black (acid process)	lb. .07½	@	.07¾
Black, selected tires	lb. .06½	@	.06¾
Truck, Heavy Gravity	lb. .08½	@	.08¾

Miscellaneous

Mechanical blends	lb. .04½	@	.05½
White	lb. .13½	@	.14½

Tire Fabrics

(Prices Net at the Mill)

Peeler, carded, 23/5/3	lb. .43	@	—
Peeler, carded, 23/4/3	lb. .44	@	—
Peeler, carded, 15/3/3	lb. .41	@	—
Peeler, carded, 15/4/2	lb. .41	@	—
Peeler, carded, 13/3/3	lb. .40	@	—

CHAFERS

Carded, American, 1 1/16"	lb. .44	@	—
Carded, American, 1"	lb. .31	@	.43

Cotton

The price for middling uplands on the Exchange has moved in a 196 point range since our last report, low for the period being 16.65 on August 15 and the high of 18.61 being reached today (September 9). Starting with 16.91 on August 13, the price dropped to 16.65 on August 15 due to hedging and liquidation and then started an upward movement, largely based on reports of unfavorable weather and insect damage, reaching 17.16 on August 20. Liquidation again broke the price but an upward movement started again in the last few days in the month and has continued up to the present. Weevil reports from the Georgia area, trade and government estimates on the season's crop, and active participation in the market by Wall Street interests served to send the price into the highest channels since November, 1929. The Crop Report Board of the Department of Agriculture has forecast a crop of 10,710,000 bales for the 1941-42 season, based on a condition of 65% as of September 1. Trade reports set the crop at 10,387,000 bales, based on a condition of 62.6% at the end of August. The rise is expected to continue. Quotations for middling uplands on the Exchange follow:

	Aug. 12	September 9		
	Close	High	Low	Close
October	15.70	18.00	17.72	17.96
December	15.88	18.29	17.91	18.17
March	16.03	18.48	18.12	18.38

Sheetings

48x40	36 in.	5.50	lb.	—	@ 6.909
40x40	36 in.	6.15	lb.	—	@ 6.179
40x36	36 in.	6.50	lb.	—	@ 5.846
48x48	40 in.	2.50	lb.	—	@14.20
48x48	40 in.	2.85	lb.	—	@12.460
56x60	40 in.	3.60	lb.	—	@10.555
48x44	40 in.	3.75	lb.	—	@ 9.733

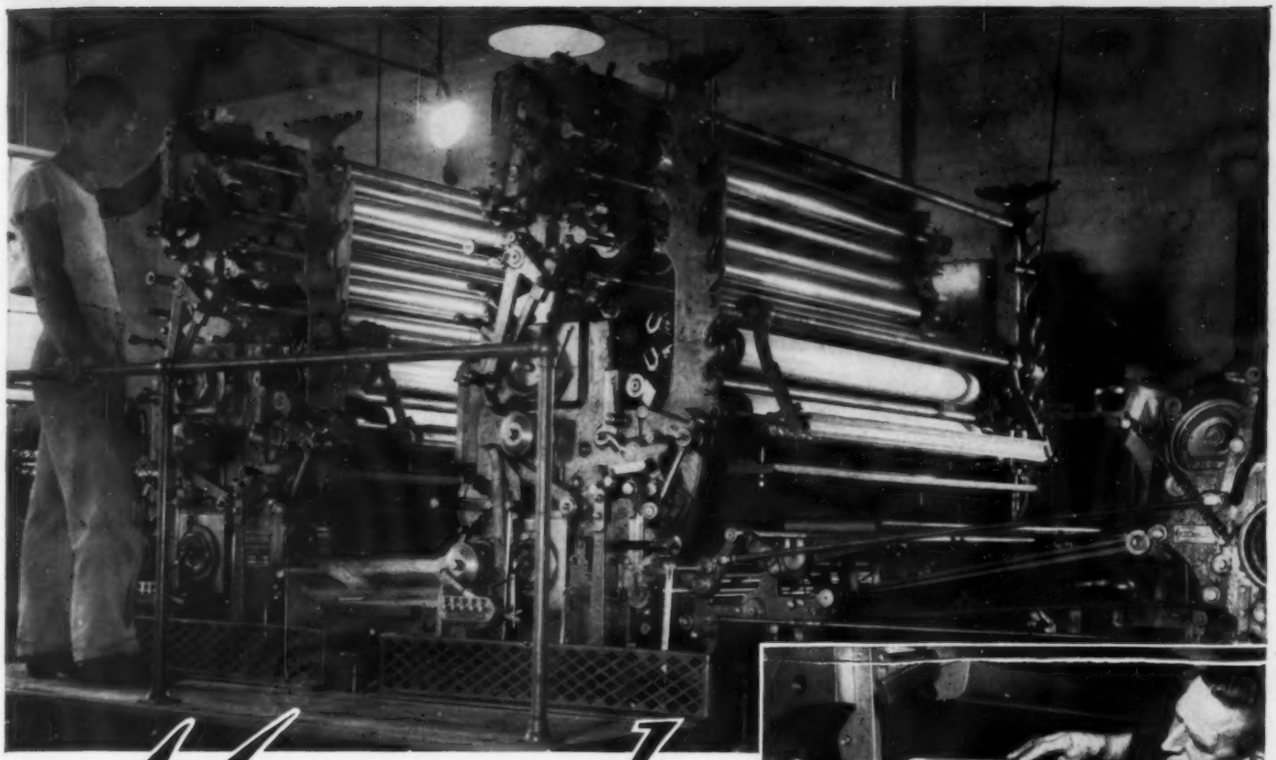
Ducks

Enameling (single filling)	lb. .40	@	.43
Belting and Hose	lb. .35	@	—
Single filling, A grade	lb. .16½	@	.17½
Double filling	lb. .17½	@	.19½

Closing Rubber Prices on New York Commodity Exchange, Inc.

"New" Standard Contract of 10 Tons

In accordance with a request received from the Price Administrator to liquidate all outstanding rubber futures contracts, the Board of Governors of the Commodity Exchange, Inc., suspended trading in rubber futures at the close of business on August 13. A special committee has been appointed by the President of the Commodity Exchange to investigate the open rubber futures contracts in order to determine the manner and terms of liquidation. No decision has been reached at this writing. Accordingly, until conditions change, we can no longer provide in this space the daily closing rubber prices on the Commodity Exchange.



Merrily They Roll Along

AMERICA'S finest printing and lithographing presses are producing better work more economically with HYCAR O. R.* rolls.

The widespread and increasing application of HYCAR rollers to the presses of America is one of many examples of the superiority of HYCAR O. R. in all mechanical rubber goods where maximum resistance to oil, heat, aging and abrasion is essential.

In severe service, hose . . . bearings . . . gaskets . . . packings . . . V-belts, etc., all are longer-lived when compounded with HYCAR — the versatile oil-resistant Synthetic Rubber.

★ Non-staining, non-discoloring, HYCAR O.R.* now is available in limited quantities. Your request, sent to us on your company letterhead, will bring you samples . . . also our new Softener Manual.

The ALL-AMERICAN SYNTHETIC RUBBER HYCAR OIL RESISTANT

HYDROCARBON CHEMICAL & RUBBER CO.

335 S. MAIN STREET, AKRON, OHIO

YOU CAN PRODUCE BETTER GOODS MORE ECONOMICALLY WITH HYCAR O. R.

CHEMICAL MARKETS

New York, Sept. 9, 1941
All Prices F.O.B. Works

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.26 @	.35
A-10	lb.	.34 @	.40
A-11	lb.	.52 @	.65
A-19	lb.	.52 @	.65
A-32	lb.	.70 @	.80
A-77	lb.	.42 @	.55
A-100	lb.	.42 @	.55
Aldehyde ammonia, crystals	lb.	.65 @	.70
Altax	lb.	.55 @	.60
Beutene	lb.	.70 @	.75
Butyl Zimate	lb.	— @	2.15
Captax	lb.	.50 @	.55
Crylene	lb.	.40 @	.47
Di-Ortho-Tolyguanidine	lb.	.44 @	.46
Diphenylguanidine	lb.	.35 @	.45
El-Sixty	lb.	.50 @	.65
Ethyl Zimate	lb.	— @	2.15
Ethylidene aniline	lb.	.42 @	.43
Formaldehyde aniline	lb.	.31 @	—
Guantal	lb.	.40 @	.50
Hepteen	lb.	.35 @	.40
Hexamethylenetetramine	lb.	.33 @	—
Lead Oleate, No. 999	lb.	.13 @	—
Witco	lb.	.15 @	—
Monex	lb.	— @	1.75
Phenex	lb.	.50 @	.55
Pip-Pip	lb.	— @	1.90
R & H 50-D	lb.	.42 @	.43
R-2	lb.	1.40 @	1.80
R-2 Crystals	lb.	2.50 @	2.75
RN-2	lb.	1.40 @	1.80
RN-2 Crystals	lb.	1.90 @	2.15
Rotax	lb.	.60 @	.65
Safex	lb.	1.20 @	1.30
SPDX	lb.	.70 @	.75
Super-Sulphur No. 1	lb.	.50 @	—
No. 2	lb.	.18 @	.20
Thiocarbanilid, drums	lb.	.26 @	.35
Thiurad	lb.	— @	1.75
Trimene	lb.	.55 @	.65
base	lb.	1.05 @	1.20
Triphenylguanidine	lb.	.45 @	—
Tuads	lb.	— @	2.00
Ulto	lb.	1.25 @	1.75
Ureka	lb.	.60 @	.75
Blend B	lb.	.60 @	.75
Blend C	lb.	.56 @	.65
Vulcanex	lb.	.42 @	.43
Vulcanol	lb.	.85 @	—
Zimate	lb.	— @	2.00
Inorganic			
Litharge, domestic	lb.	.07 @	.07½
Magnesia, calcined, heavy	lb.	.04 @	—

COLORS

Blacks (See Next Column)			
Blues			
Prussian	lb.	.33 @	—
Ultramarine	lb.	.16 @	.27
Browns			
Mapico	lb.	.11 @	—
Umber, Turkey	lb.	.04¾ @	.05¼
Greens			
Chrome	lb.	.21 @	.30
Guignet's Green	lb.	.70 @	—
Reds			
Antimony crimson, 15/17	lb.	— @	—
sulfur, free	lb.	— @	—
Indian	lb.	.08¾ @	—
Domestic (Maroon)	lb.	.11 @	—
Mapico	lb.	.09¼ @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red	lb.	.09¼ @	—
Whites			
Cryptone No. 19	lb.	.05¼ @	.05½
Cryptone CB No. 21	lb.	.05¼ @	.05½
Cryptone ZS-86	lb.	.07¾ @	.08
Cryptone ZS-230	lb.	.07¾ @	.08
Cryptone ZS-800	lb.	.07¾ @	.08
Lithopone:			
Albalith	lb.	.0385 @	.0410
Azolith	lb.	.0385 @	.0410
Ray-bar	lb.	.05½ @	.05¾
Ray-cal	lb.	.05¼ @	.05¾
Rayox	lb.	.13½ @	.14¼
Titanox A	lb.	.13½ @	.13¾
Titanox B	lb.	.05½ @	.05¾
Titanox C	lb.	.05¼ @	.05½
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
Anaconda, lead free	lb.	.06½ @	.06¾
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
Kadox, black label—15	lb.	.06½ @	.06¾
Red label—17	lb.	.06½ @	.06¾
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
U. S. P.—7. bbls.	lb.	.09½ @	.09¾
Zinc Oxide—French Process:			
Florence White Seal—7 bbls.	lb.	.08½ @	.08¾
Green seal—8	lb.	.08 @	.08¼
Red seal—9	lb.	.07½ @	.07¾
Yellows			
Cadmolith	lb.	.50 @	.55
Chrome	lb.	.14½ @	—
Mapico	lb.	.06¾ @	—

BLACKS
(In bags, carload lots)

Aerfloted Arrow	.0335 @	—
Certified	.0335 @	—
Certified Spheron	.0335 @	—
Continental	.0335 @	—
Disperso	.0335 @	—
Dixiedensed	.0335 @	—
Dixiedensed 66	.0335 @	—
Excello	.0335 @	—
Furnex	.03 @	—
Furnex Beads	.03 @	—
Gastex	.03 @	—
Kosmobile	.0335 @	—
Kosmobile 66	.0335 @	—
Micronex (Amarillo)	.0335 @	—
Micronex Beads (Amarillo)	.0335 @	—
Pelletex	.03 @	—
P-33	.0475 @	—
Shell Carbon (Delivered Midwest)	.024 @	—
Supreme	.0335 @	—
Thermax	.02 @	—
Wyex	.0335 @	—

COMPOUNDING MATERIALS

Aluminum Flake	ton	21.85	@24.50
Asbestine	ton	14.00	@18.00
Barium carbonate (98-100%)	ton	47.00	@49.00
Barytes	ton	22.85	@31.50
Bentonite	ton	11.00	@16.00
Blanc fixe, dry	ton	50.00	@62.50
Calcene	ton	37.50	@43.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	45.00	@60.00
heavy	ton	45.00	@55.00
Clay, Aerfloted, Suprex	ton	10.00	@22.00
Crown (f.o.b. plant)	ton	10.00	@ —
Dixie	ton	10.00	@22.50
Langford	ton	—	@ 7.50
McNamee	ton	10.00	@22.50
Par	ton	10.00	@22.50
Witco	ton	10.00	@ —
Cotton Flock (Dark)	lb.	.10½ @	.13
Kalite No. 1	ton	24.00	@50.00
Kalite No. 3	ton	34.00	@60.00
Kalvan	ton	95.00	@121.00
Magnesium carbonate	lb.	.06½ @	.09¾
Mica	ton	35.00	@44.00
Mineralite	ton	—	@30.00
Pyrax A	ton	6.50	@20.00
Rottenstone (powd. Dom.)	ton	25.50	@37.50
Silene (calcium silicate)	lb.	.04 @	.045
Starch, powdered	cwt.	2.90 @	4.10
Talc, domestic	ton	17.00	@25.00
Whiting, commercial	ton	16.00	@26.00
Columbia Filler	ton	9.00	@14.00
Witco	ton	6.00	@ —
Wood Flour (100 mesh)	ton	30.00	@32.00

MINERAL RUBBER

285°-300° Mineral Rubber	ton	22.00	@ —
Black Diamond	ton	25.00	@ —
Genasco, solid (factory)	ton	—	@ —
Hard Hydrocarbon	ton	22.00	@42.00
Parmr, solid	ton	—	@ —
Pioneer, MR, solid	ton	—	@ —

MISCELLANEOUS

Aromatics—Rodo 20	lb.	3.50 @	4.00
Rodo 210	lb.	4.50 @	5.00
Curodex 19	lb.	2.75 @	—
Curodex 188	lb.	3.50 @	—
Curodex 198	lb.	4.50 @	—
Para-Dors	lb.	4.50 @	—
Aresklene No. 375 (dispersing, wetting and penetrating agent)	lb.	.35 @	.50
Darvan (dispersing agent)	lb.	.30 @	.39
Santomerse S (dispersing, wetting, penetrating and stabilizing agent)	lb.	.11 @	.25
Sponge Paste	lb.	— @	.18
Sunproof	lb.	.23 @	.28
Tackol (tackifier)	lb.	.085 @	.18
Tonox	lb.	.52 @	.61
Ty-Ply R (and S)	gal.	6.75 @	8.75
Unicel (blowing agent)	lb.	.50 @	—

SOFTENERS

Acids			
Acetic, 28%, bbls.	100 lb.	3.18 @	3.43
Nitric, 36 degrees	cwt.	5.00 @	5.95
Acids, Fatty			
Laurex	lb.	.13 @	.15½
SL 210	lb.	.12 @	.14
Stearex Beads	lb.	.10 @	.11
Stearic, double pressed	lb.	.12½ @	.13½
Stearite	lb.	.10 @	—

Alkalies			
Caustic Soda, 76%	cwt.	2.70 @	5.70
Soda Ash, 58%	cwt.	1.10 @	2.93
Oils			
Cycline Oil	gal.	.14 @	.20
Degras, bbls.	lb.	.08 @	.08½
Fluxrite	lb.	.05½ @	.06½
Para-Flux	gal.	.08½ @	.18
Para-Lube	lb.	.425 @	.48
Petrolatum, amber	lb.	.03¼ @	.04¼
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
Pine, steam distilled	gal.	.54 @	.59
Rosin Oil, cmpd.	gal.	.40 @	—
Rubberol	lb.	.13½ @	.14
Rubtack	lb.	.10 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	— @	—
Witco Softener No. 20	gal.	.20 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.06 @	.06½
coal tar	ton	19.00	@22.00
hardwood	ton	16.00	@22.50
pine, 200 lb. gr. wt. bbl.		6.00	@ 6.50
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22½ @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	ton	20.00	@26.00
Solvents			
Acetone, pure	lb.	.07 @	.09
Benzene, 90%, tank car	gal.	.14 @	—
Beta-Trichlorethane	gal.	— @	.20
Bondogen	lb.	.98 @	1.25
Carbon, bisulfide	lb.	.05 @	.08½
Carbon tetrachloride	gal.	.66½ @	1.17
Dichlorethylene	lb.	— @	—
Dipentene, cml., drums	gal.	.38 @	.50
Ethylene dichloride	lb.	.07½ @	.08
Plastogen	lb.	.07¾ @	.12
Reogen (drums)	lb.	.11½ @	.23
Rub-Sol	gal.	.09½ @	—
Trichlorethylene	lb.	— @	.08½
Turpentine, spirits	gal.	.48½ @	.52½
dest. dist., drums	gal.	.30 @	.36
Waxes			
Beeswax, white	lb.	.41 @	.45
Carnauba, yellow	lb.	.72 @	.75
Ceresin, white, dom.	lb.	.11 @	.15½
Montan, crude	lb.	— @	—
Paraffin			
Yellow crude scale, 124/126	lb.	.05 @	—
Refined, 123/125	lb.	.05¾ @	—

ANTI-OXIDANTS

Agerite Alba	lb.	2.00 @	2.15
Exel	lb.	1.00 @	1.02
Gel	lb.	.57 @	.59
Hipar	lb.	.65 @	.67
Powder	lb.	.52 @	.54
Resin	lb.	.52 @	.54
Resin D	lb.	.52 @	.54
White	lb.	1.25 @	1.60
Albasan	lb.	.70 @	.75
Antox	lb.	— @	.56
B-L-E	lb.	.52 @	.61
Flectol B	lb.	.52 @	.65
Flectol H	lb.	.52 @	.65
Flectol White	lb.	.90 @	1.15
Neozone A, B, C, D, E	lb.	.52 @	.63
Oxynone	lb.	.77 @	.90
Retardex	lb.	.45 @	.48
Santoflex B	lb.	.52 @	.65
Santovar A	lb.	1.15 @	1.40
S.C.R.	lb.	.33 @	.35
Stabilite	lb.	.52 @	.54
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.52 @	.61

MOLD LUBRICANTS

Aresklene	lb.	.35 @	.50
Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Lubrex	lb.	.25 @	.30
Mineralite	ton	—	@30.00
Mold Paste	lb.	.12 @	.18
Rubberol	lb.	.13½ @	.14
Sericite	ton	65.00	@75.00
Soap Tree Bark, cut, sifted	lb.	.06 @	.08

FACTICE OR RUBBER SUBSTITUTES

Amberex	lb.	.25 @	—
Amberex Type B	lb.	.18¾ @	—
Black	lb.	.08 @	.12
White	lb.	.08½ @	.13½
Brown	lb.	.08 @	.11½
Neophax A	lb.	.119 @	—

VULCANIZING INGREDIENTS

Dispersed Sulfur No. 2	lb.	.07½ @	.15
Sulfur Chloride, yellow (drs.)	lb.	.035 @	.04
Sulfur, rubber makers			
Refined (bags)	cwt.	2.85 @	—
Commercial (bags)	cwt.	2.00 @	—
Telloy	lb.	1.75 @	—
Vandex	lb.	1.75 @	—

STATISTICS

Crude Rubber — Latex & Guayule — Reclaim — Tires & Tubes — Automobiles — Rims — Gasoline — Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1924	325,899	173,367,272	23.75	10,309	6,057,637	26.23	315,590
1925	393,370	426,167,504	48.36	14,827	19,847,753	59.76	378,543
1926	409,944	501,131,064	54.57	17,671	22,470,583	56.77	392,273
1927	424,733	338,688,492	35.60	27,775	24,735,488	39.76	396,958
1928	432,633	242,727,423	25.05	32,159	18,128,761	25.17	400,474
1929	560,082	239,177,811	19.06	36,485	16,868,718	20.64	523,597
1930	482,083	139,133,048	12.88	30,205	9,310,205	13.76	451,878
1931	497,176	72,922,845	6.55	25,595	4,255,572	7.42	471,581
1932	409,556	31,936,459	3.48	20,930	2,015,612	4.30	388,626
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	387,280
1934	449,513	97,929,676	9.73	23,848	5,770,109	10.80	425,665
1935	453,134	115,299,448	11.36	11,389	3,084,331	12.09	441,745
1936	467,064	152,072,496	14.54	12,581	4,488,223	15.93	454,483
1937	574,600	237,307,041	18.44	7,902	3,385,433	19.02	566,698
1938	397,620	125,357,730	14.07	5,652	1,799,124	14.21	391,968
1939	469,803	167,558,245	15.92	13,125	5,832,618	19.84	456,678
1940	780,820	303,117,726	17.33	7,060	3,197,136	20.22	773,760
1940:							
June	51,074	20,019,581	17.50	623	295,334	21.15	50,451
July	66,931	26,426,632	17.63	100	49,828	22.20	66,831
Aug.	70,453	27,608,883	17.49	416	183,369	19.69	70,037
Sept.	75,770	29,317,540	17.27	666	349,443	23.43	75,104
Oct.	73,179	27,975,598	17.07	316	123,216	17.38	72,863
Nov.	69,844	26,917,136	17.21	126	52,020	18.45	69,718
Dec.	94,172	36,369,973	17.24	205	94,422	20.52	93,967
1941:							
Jan.	84,201	33,370,482	17.69	292	138,009	21.11	83,909
Feb.	70,745	28,469,753	17.97	327	144,139	19.69	70,418
Mar.	84,991	34,030,846	17.88	329	163,375	22.19	84,662
Apr.	61,288	24,193,639	17.62	238	99,371	18.96	61,054
May	98,438	39,537,574	17.93	370	204,865	24.72	98,068
June	62,124	25,179,498	18.09	476	257,254	24.13	61,648

Note: "Gross Imports" do not include latex or guayule. To secure more accurate figures for "Net Imports" latex and guayule figures (shown below) should be added and the re-export figure deducted from the total. Annual figures for 1924-36 were revised in February, 1937.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule Tons	Guayule Dollars	Balata Tons	Balata Dollars	Jelutong Tons	Jelutong Dollars	Liquid Latex (1) Tons	Liquid Latex (1) Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,272	3,537,510
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,394	4,686,743
1927	5,018	2,674,957	582	477,246	7,785	2,448,657	1,495	1,170,650
1928	3,077	1,755,685	731	430,855	7,552	2,540,059	4,007	2,121,786
1929	1,275	545,175	728	566,964	8,204	2,458,126	3,729	1,788,391
1930	1,096	347,388	502	422,684	5,907	1,403,244	4,458	1,508,786
1931	....	.....	1,207	411,380	5,777	1,019,010	4,675	888,909
1932	....	.....	707	147,403	4,607	616,596	5,112	601,999
1933	...	.....	1,659	2,261,869	5,990	944,895	11,085	1,833,671
1934	398	75,349	1,054	438,209	4,987	943,752	13,107	3,643,221
1935	459	86,835	615	188,384	5,644	1,063,126	13,553	3,782,222
1936	1,229	286,552	535	199,368	6,163	1,296,364	19,852	6,659,899
1937	2,694	745,873	354	151,344	7,109	2,017,786	23,185	10,213,670
1938	2,485	623,819	509	181,140	9,132	2,944,504	11,878	4,147,318
1939	2,232	463,345	694	265,553	6,640	1,603,418	27,438	10,467,552
1940	3,634	758,007	648	300,500	7,451	2,449,137	33,789	14,593,466
1940:								
June	365	74,957	47	10,977	390	146,196	2,451	1,004,007
July	262	53,058	65	20,553	336	115,599	2,281	993,411
Aug.	297	59,464	61	22,638	701	276,642	2,278	1,022,531
Sept.	250	49,845	40	19,245	712	246,641	2,953	1,337,487
Oct.	381	77,286	70	38,092	1,150	382,168	1,156	512,153
Nov.	392	78,587	67	43,939	445	152,297	2,308	1,169,086
Dec.	278	62,586	54	39,471	1,102	341,876	3,534	1,539,957
1941:								
Jan.	447	104,128	57	32,910	698	221,911	2,184	1,019,741
Feb.	283	65,942	41	22,790	768	245,732	2,946	1,279,648
Mar.	426	98,187	36	16,147	715	258,514	1,707	774,225
Apr.	423	95,916	64	18,533	514	189,520	1,594	648,217
May	334	76,414	61	44,381	822	287,249	2,632	1,117,226
June	383	86,949	67	30,470	552	179,779	2,070	936,944

(1) Weight given in pounds of dry rubber contained in latex.
Note: Annual figures for 1924-1936 revised on basis of information received on February 8, 1937.

U. S. Consumption of Crude Rubber

(Including Latex)

	Figures on Monthly Basis: 1934	1935	1936	1937	1938	1939	1940	1941
Jan.	39,190	46,636	48,631	50,879	31,265	47,387	58,061	65,989
Feb.	40,515	42,720	36,841	51,950	25,357	43,422	52,078	62,692
Mar.	47,003	42,153	42,813	54,129	32,389	51,416	52,454	69,024
Apr.	44,853	44,247	52,031	51,859	29,730	45,268	52,361	71,374
May	42,918	41,101	50,612	51,795	30,753	45,484	54,513	71,365
June	40,147	36,156	52,772	51,860	32,540	48,438	47,834	84,912
July	32,553	35,917	48,250	43,703	34,219	44,975	48,354	68,653
Aug.	33,216	38,775	46,777	41,506	40,552	51,740	53,307	
Sept.	30,258	37,086	46,449	43,945	40,183	51,402	52,469	
Oct.	31,253	41,969	49,637	38,754	42,850	57,155	59,644	
Nov.	34,748	42,310	50,433	34,025	49,050	55,677	57,716	
Dec.	36,569	42,474	49,754	29,195	48,143	49,636	59,709	
Tot.	453,223	491,544	575,000	543,600	437,031	592,000	648,500	

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption Tons	Consumption % to Crude	Stocks	Year	Production	Consumption Tons	Consumption % to Crude	Stocks
1931	129,690	123,000	35.1	21,714	1936	150,571	141,486	24.6	19,000
1932	75,656	77,500	23.3	16,334	1937	185,033	162,000	29.8	28,800
1933	93,587	85,000	21.2	17,780	1938	122,400	120,800	29.9	23,000
1934	108,162	100,855	22.3	20,000	1939	186,000	170,000	28.7	25,250
1935	122,948	117,523	23.9	17,000	1940	208,971	190,244	29.3	32,636
	Figures on Monthly Basis								
1940:									
Jan.	19,239	16,341	28.1	27,089	July	14,299	14,539	30.1	27,129
Feb.	17,938	15,629	30.0	27,962	Aug.	17,161	14,464	27.1	28,526
Mar.	17,182	16,200	30.9	27,524	Sept.	16,379	14,835	28.3	29,039
Apr.	16,518	16,573	31.7	26,492	Oct.	19,300	16,807	28.2	30,816
May	17,499	15,984	29.3	27,141	Nov.	17,636	16,312	28.3	31,459
June	16,581	15,163	31.7	27,701	Dec.	19,239	17,397	29.1	32,636
1941:									
Jan.	20,413	19,086	28.9	33,380	July	23,111	21,725	31.6	36,751
Feb.	19,506	18,222	29.1	33,654	Aug.	.....	.....	...	.....
Mar.	22,006	19,611	28.4	35,028	Sept.	.....	.....	...	.....
Apr.	21,574	20,427	28.6	35,336	Oct.	.....	.....	...	.....
May	22,775	21,405	30.0	35,871	Nov.	.....	.....	...	.....
June	23,790	22,559	26.6	36,265	Dec.	.....	.....	...	.....

Note: The above figures are based on the annual surveys conducted by the Leather and Rubber Division, Bureau of Foreign & Domestic Commerce, Washington, D. C., with the exception of those for the current year which are estimates made by the Rubber Manufacturers Association. They are revised frequently and the latest available issue should always be consulted for the most reliable figures. The annual figures are more accurate. Stocks shown are those on hand at the end of the indicated month or year.

U. S. Consumption of Gasoline

(Bureau of Mines Statistics)
(In Thousands of Barrels of 42 Gallons)

	1939*	1940	1941		1939*	1940	1941
January	38,089	40,370	45,344	August	54,025	55,346	.....
February	34,928	37,557	42,253	September	49,505	52,297	.....
March	43,042	44,607	48,606	October	49,854	53,807	.....
April	44,264	47,683	55,105	November	47,407	49,074	.....
May	49,766	52,946	59,107	December	43,807	46,413	.....
June	50,133	55,459	58,413				
July	50,689	53,865	.....	Total	555,509	589,424	.....

* Revised.

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1929	24,141,502	1933	8,713,962	1937	22,257,564
1930	17,364,096	1934	12,255,118	1938	10,612,138
1931	11,253,800	1935	18,664,107	1939	17,471,914
1932	6,261,336	1936	20,790,194	1940	19,378,558
1941		1941		1941	
January ...	2,032,121	May	2,407,864	September .	.....
February ..	2,131,211	June	2,308,986	October ...	.....
March	2,665,961	July	2,061,144	November .	.....
April	2,682,225	August	1,532,032	December ..	....

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave
1939																																
June	16 7/8	16 3/4	16 3/4	—	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	—	—	16 3/4	16 7/8	16 7/8	16 3/4	16 3/4	16 3/4	—	16 3/4	16 7/8	16 3/4	16 3/4	16 3/4	—	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	16 7/8	—	16 3/4
July	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16 3/4
August	16 3/4	16 7/8	16 3/4	16 1/8	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	16 3/4
September	19 7/8	18 7/8	18 7/8	—	24	—	21 1/2	16 3/4	16 3/4	16 7/8	16 3/4	16 3/4	16 7/8	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 3/4	16 7/8	16 7/8	16 7/8	16 7/8	16 3/4	16 1/8	16 3/4	16 3/4
October	20	18 7/8	18 7/8	19 1/4	19 1/4	19 1/2	19 1/2	20	22	19 1/4	23 3/4	23	22 3/4	22	22	22	22	22	21 3/4	21 1/2	22	22	21 3/4	20 3/4	20 1/2	20	20	20	19 3/4	20	20 1/8	21 1/4
November	20 1/4	20 1/4	19 3/4	20 3/4	20 3/4	20 1/2	19 3/4	19 3/4	20 3/4	20 1/2	19 3/4	19 3/4	20 1/2	20	20	19 3/4	19 3/4	20 1/2	20	20	20 1/4	20 1/4	20 1/4	20 1/4	20 1/4	20 1/4	19 7/8	20 1/8	19 7/8	20	20 1/4	19 7/8
December	20	20	—	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	20 7/8	20 7/8	20 1/2	20 1/2	20	20	20 3/4	20	20 1/2	20 3/4	20 3/4	20 1/4	20 1/4	—	20 1/4	20 1/4	20 1/4	19 3/4	19 3/4	19 3/4	20 1/4	—	20
1940																																
January	19 3/4	19 3/4	19 1/4	19 1/4	19 3/4	19 7/8	—	19 3/4	19 1/4	19 3/4	19 1/2	19 3/4	19 1/4	—	19 7/8	19 1/4	19 1/2	19 3/4	19 1/2	19	18 7/8	19 1/4	19 7/8	—	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 1/8	19
February	18 3/4	18 3/4	18 3/4	18 5/8	18 3/4	18 3/4	18 1/8	19 3/4	19 3/4	19 3/4	18 3/4	18 3/4	19 3/4	19 1/4	19 1/4	19 1/4	19 1/4	19 1/4	19 1/4	18 7/8	18 5/8	18 5/8	—	—	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	—	—	18 7/8
March	18 7/8	18 3/4	18 3/4	18 5/8	18 3/4	18 3/4	18 1/8	18 1/4	18 1/4	18 7/8	18 7/8	18 3/4	19 1/4	18 5/8	18 5/8	18 7/8	19 1/4	19 1/4	19 1/4	19 1/4	19	19	19 1/4	19 1/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	18 3/4	—	18 3/4
April	18 7/8	18 5/8	18 5/8	18 3/4	18 3/4	18 7/8	18 7/8	18 7/8	19	18 7/8	18 7/8	18 3/4	18 1/4	19	19	19 3/4	19 3/4	20	20	20	20	20	20	20	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	—	19 3/4
May	19 3/4	19 3/4	20	20 1/4	21 1/2	21 3/4	19 7/8	20 3/4	21 3/4	23 1/2	23 1/2	23 1/4	22 3/4	23 1/8	22 1/2	23 1/8	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4
June	22	21 3/4	21 1/2	21 1/2	21 3/4	21 3/4	21 3/4	20 3/4	21 3/4	22 1/2	22 1/2	22 1/4	22 1/4	22 1/2	22 1/2	22 1/2	22 1/2	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4
July	19 7/8	19 3/4	20 1/2	—	19 7/8	19 7/8	19 3/4	20 3/4	20 3/4	20 1/2	20 3/4	20 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	20 1/4	20 1/4	20	19 3/4
August	19 3/4	21 1/2	19 3/4	—	19 7/8	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4
September	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 7/8	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4
October	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 7/8	19 3/4	19 3/4	19 3/4	19 3/4	20 1/2	20 1/2	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4
November	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 7/8	19 3/4	19 3/4	19 3/4	19 3/4	20 1/2	20 1/2	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4
December	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 7/8	19 3/4	19 3/4	19 3/4	19 3/4	20 1/2	20 1/2	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4	19 3/4
1941																																
January	20 1/4	—	20 1/2	20 1/2	—	—	20 1/2	20 3/4	—	20 7/8	20 7/8	—	20 1/4	20	19 1/8	19 1/8	19 3/4	19 3/4	19 3/4	19 1/4	21	22 3/4	22 3/4	19 7/8	23	23	22	22 3/4	22 3/4	22 3/4	19 1/8	19 3/4
February	—	—	20 7/8	19 7/8	19 7/8	19 7/8	19 7/8	19 7/8	—	—	—	22	22 1/4	22 1/2	22 3/4	22 3/4	22 3/4	22 3/4	22 3/4	23 1/4	23 1/2	23 1/2	23 3/4	23 3/4	23 3/4	23 3/4	23 3/4	23 3/4	23 3/4	23 3/4	20 1/8	20 1/2
March	—	—	22 1/4	21 7/8	21 7/8	21 7/8	21 7/8	21 1/2	—	—	—	22 3/4	22 3/4	22 3/4	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	22 1/2	22 1/2
April	—	—	22 3/4	22	—	—	22 1/4	22	—	—	—	22 3/4	22 3/4	22 3/4	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	23 1/2	22 1/2	22 1/2
May	—	—	24	—	—	—	24	24	—	—	—	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
June	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
July	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
August	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
September	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Markets)

Average Price per Pound for Years 1913-1932

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1914	65.33	1918	60.15	1922	17.50	1926	48.50	1930	11.98
1915	65.85	1919	48.79	1923	29.45	1927	37.72	1931	6.17
1916	72.50	1920	36.30	1924	26.20	1928	22.48	1932	3.49
1917	72.23	1921	16.36	1925	72.46	1929	20.59	1933	5.96

Average Monthly Price per Pound Since 1933

	1934 Cents	1935 Cents	1936 Cents	1937 Cents	1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	9.32	13.10	14.35	21.37	14.63	15.75	19.06	19.88
Feb.	10.45	12.92	15.48	21.33	14.71	15.93	18.83	20.43
Mar.	11.01	11.51	15.89	24.09	13.55	16.26	18.58	22.17
Apr.	12.10	11.55	15.98	23.44	11.84	15.87	19.16	22.74
May	13.26	12.05	15.62	21.14	11.57	16.07	21.21	23.90
June	13.51	12.57	15.85	19.29	12.57	16.37	22.20	21.88
July	14.60	12.10	16.49	18.86	15.37	16.51	21.12	22.19
Aug.	15.47	11.98	16.25	18.37	16.08	16.67	19.62	22.70
Sept.	15.36	11.55	16.46	18.55	16.15	21.24	19.28	
Oct.	13.96	12.62	16.55	16.28	16.89	19.89	20.33	
Nov.	13.04	13.15	17.97	14.60	16.24	20.21	21.04	
Dec.	12.98	13.28	20.01	15.41	16.05	20.01	20.76	
Average for Year	12.92	12.37	16.41	19.39	14.64	17.57	20.10	

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	1941 May	1941 June	1941 July	1941 Aug.	Day	1941 May	1941 June	1941 July	1941 Aug.
1	14	—	—	—	16	14 1/16	—	—	
2	14	—	—	—	17	—	—	—	
3	—	13 7/16	—	—	18	—	—	—	
4	—	13 1/2	—	—	19	14	—	—	
5	—	13 9/16	—	—	20	13 15/16	—	—	
6	—	13 5/8	—	—	21	13 7/8	—	—	
7	—	—	—	—	22	13 7/8	—	—	
8	—	—	—	—	23	13 1/2	—	—	
9	—	—	—	—	24	—	—	—	
10	—	—	—	—	25	—	—	—	
11	—	—	—	—	26	13 1/8	—	—	
12	—	—	—	—	27	13 5/8	—	—	
13	—	—	—	—	28	13 7/16	—	—	
14	—	—	—	—	29	13 7/16	—	—	
15	14	—	—	—	30	13 3/8	—	—	
					31	—	—	—	

Note: No quotations have been made on the London Exchange since June 6.

Average Monthly Price Per Pound

Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence	Month	1938 Pence	1939 Pence	1940 Pence	1941 Pence
Jan.	7.077	7.926	11.793	12.415	Aug.	7.841	8.545	12.818	
Feb.	7.029	7.942	12.577	12.769	Sept.	7.918	9.634	11.964	
Mar.	6.590	8.120	11.651	13.967	Oct.	8.355	10.177	11.813	
Apr.	5.793	7.910	10.980	14.228	Nov.	8.111	11.210	11.801	
May	5.632	8.002	11.600	13.670	Dec.	8.005	11.559	11.963	
June	6.147	8.216	13.046	—	Average for Year	7.164	8.959	12.035	
July	7.464	8.271	12.410	—					

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	1941 July	1941 Aug.	1941 Sept.	Date	1941 July	1941 Aug.	1941 Sept.	Date	1941 July	1941 Aug.	1941 Sept.
1	15.43	16.88	—	11	16.00	16.76		22	17.41	17.00	
2	15.43	17.60	17.57	12	16.18	16.35		23	17.01	16.94	
3	15.40	—	17.91	13	—	16.91		24	17.28	—	
4	—	17.47	17.97	14	16.35	16.73		25	17.70	16.94	
5	15.45	17.24	18.01	15	16.58	16.65		26	17.91	17.30	
6	—	17.33	18.16	16	16.35	16.69		27	—	17.44	
7	15.77	17.30	—	17	16.32	—		28	17.87	17.38	
8	15.92	17.21	18.40	18	16.46	16.70		29	17.64	17.42	
9	16.02	16.97	18.61	19	16.97	16.80		30	17.08	17.57	
10	15.94	—		20	—	17.16		31	16.75	—	
				21	17.26	16.94					

Average Monthly Price Per Pound

	1938 Cents	1939 Cents	1940 Cents	1941 Cents		1938 Cents	1939 Cents	1940 Cents	1941 Cents
Jan.	8.57	8.94	11.19	10.66	Aug.	8.41	9.30	9.84	17.06
Feb.	8.91	8.97	11.10	10.87	Sept.	8.17	9.30	9.69	
Mar.	8.92	9.00	10.90	11.08	Oct.	8.61	9.24	9.62	
Apr.	8.76	8.87	10.89	11.48	Nov.	9.08	9.73	9.97	
May	8.50	9.56	10.33	12.97	Dec.	8.72	10.97	10.18	
June	8.38	9.88	10.72	14.66	Average for Year	8.66	9.46	10.40	
July	8.85	9.71	10.42	16.55					

Stocks of Crude Rubber

(All figures are in long tons)

ON HAND OR AFLOAT TO THE U. S.

End of	ON HAND 1939	ON HAND 1940	ON HAND 1941	AFLOAT 1939	AFLOAT 1940	AFLOAT 1941	TOTAL 1939	TOTAL 1940	TOTAL 1941
Jan.	220,727	139,304	309,411	48,210	90,285	153,169	268,937	229,589	462,580
Feb.	207,882	129,023	320,372	55,814	112,257	136,955	263,696	241,280	457,327
Mar.	201,752	134,871	338,147	55,981	113,619	140,228	257,733	248,490	478,375
Apr.	188,074	152,645	329,767	57,918	102,557	153,484	245,992	255,202	483,251
May	187,980	148,881	359,234	54,046	109,364	147,459	242,026	258,245	506,693
June	173,493	154,313	339,108	51,274	119,138	175,499	224,767	273,451	514,607
July	165,450	175,455	395,216	52,990	139,629	132,304	218,440	315,084	527,520
Aug.	152,029	194,760		66,717	141,286		218,746	336,046	
Sept.	136,824	220,597		68,310	137,888		205,134	358,485	
Oct.	119,404	235,353		100,500	166,837		219,904	402,190	
Nov.	105,205	250,412		114,044	158,095		219,249	408,507	
Dec.	125,800	288,864		91,095	145,950		216,895	434,814	

Note: Above figures include stocks held by United States Government.

STOCKS OUTSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Singapore and Penang	Para and Manaos	United Kingdom	United States	Total
June	32,375	1,706	25,000*	168,235	227,316
July	36,716	1,667	25,000*	190,222	253,605
August	40,395	1,580	25,000*	212,774	279,749
September	29,069	2,559	25,000*	241,538	298,166
October	33,613	3,084	30,000*	259,140	325,837
November	33,778	3,697	30,000*	276,943	344,418
December	26,773	2,165	35,000*	318,486	382,424
1941					
January	37,145	2,151	40,000*	309,411	388,707
February	46,913	2,510	40,000*	320,372	409,795
March	41,005	1,200	40,000*	338,147	420,352
April	42,085	2,205	40,000*	329,767	414,057
May	44,610	1,768	40,000*	359,234	445,612

* Estimated.

STOCKS INSIDE REGULATED AREAS

(Figures from the International Rubber Regulation Committee)

1940	Malaya	N.E.I.[1]	Ceylon [1]	Other *	Total
June	45,618	42,665	10,426	4,205	102,914
July	43,850	37,387	9,433	4,529	95,199
August	39,950	38,251	9,771	4,256	92,228
September	44,730	39,614	9,384	4,124	97,852
October	42,239	37,720	9,158	4,407	93,524
November	43,693	39,267	11,675	3,997	98,632
December	48,787	48,622	11,850	4,124	113,383
1941					
January	47,198	45,137	13,196	4,329	109,860
February	55,512	48,390	14,677	4,064	122,743
March	44,432	46,492	.....	4,210	.....
April	53,237	46,755	.....	4,009	.....
May	46,511	.....	.....	3,772	.....

(1) Estates and Dealers. (*) Estimated.

RUBBER STOCKS AFLOAT

	Afloat for United States	Afloat for Europe	All Other Afloat	Total Afloat
End of: 1940				
July	139,629	55,000	55,371	250,000
August	141,286	55,000	53,714	255,000
September	137,033	60,000	67,967	265,000
October	166,837	60,000	38,163	265,000
November	158,095	60,000	31,905	250,000
December	145,950	60,000	44,050	250,000
End of: 1941				
January	153,169	60,000	51,831	265,000
February	136,955	60,000	48,045	245,000
March	140,228	60,000	59,772	260,000
April	153,484	60,000	.....	.....
May	147,459	60,000	.....	.....
June	175,499	60,000	.....	.....
July	132,304	60,000	.....	.....

Note: *Total Afloat* figures are estimated at 1½ months' world shipments by the International Rubber Regulation Committee. *Afloat for U. S.* is supplied by the Rubber Manufacturers Association. *Afloat for Europe* is estimated. *All Other Afloat* is determined by subtraction.

TOTAL WORLD STOCKS

At End of:	1936	1937	1938	1939	1940	1941
January	600,479	454,249	549,762	497,665	433,841	721,575
February	599,355	445,265	565,833	479,578	429,551	730,294
March	583,318	447,856	586,666	460,723	447,472	743,231
April	567,172	428,249	586,291	438,252	465,345	755,334
May	541,871	413,134	568,158	429,979	470,981	.....
June	520,255	434,250	573,136	407,640	500,774	.....
July	519,074	445,782	580,654	418,639	547,708	.....
August	500,520	457,462	565,394	397,345	579,119	.....
September	493,585	470,768	551,447	396,867	631,888	.....
October	486,159	479,398	540,976	413,274	651,775	.....
November	466,491	493,266	512,196	395,217	659,308	.....
December	466,576	545,533	482,852	391,125	702,089	.....
Monthly Avge.	528,738	460,022	555,280	427,192	543,321	.....

Note: Figures prior to 1941 represent principal world stocks only, as supplied by the Department of Commerce. Figures since 1941 represent total world stocks, as compiled by the Commodity Exchange, Inc.

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	13,437	13,355	11,376	15,565	7,314	13,946	14,896	16,333
Apr.-June	13,565	12,597	14,892	15,834	7,380	13,759	15,636	18,259
July-Sept.	9,822	11,312	14,914	12,207	10,794	15,182	13,877	
Oct.-Dec.	10,406	12,099	14,858	9,704	12,360	14,726	14,777	
Total	47,230	49,363	56,040	53,310	37,848	57,613	59,186	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,730	11,154	10,554	14,143	7,388	12,445	12,791	15,263
Apr.-June	14,998	13,473	15,940	15,741	9,564	15,107	17,595	21,447
July-Sept.	11,648	13,489	14,037	13,106	11,243	15,791	12,904	
Oct.-Dec.	9,310	12,066	12,855	10,495	12,098	14,165	15,484	
Total	46,686	50,182	53,386	53,485	40,293	57,508	58,774	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	11,651	11,675	8,762	12,004	10,547	9,963	10,789	10,149
Apr.-June	10,219	10,755	7,556	12,081	8,337	8,632	8,871	7,079
July-Sept.	8,419	8,288	8,690	11,200	7,859	8,080	9,837	
Oct.-Dec.	9,455	8,196	10,717	10,383	8,166	8,665	9,127	

Figures for Recent Months

	PRODUCTION 1939	PRODUCTION 1940	PRODUCTION 1941	SHIPMENTS 1939	SHIPMENTS 1940	SHIPMENTS 1941	INVENTORY [2] 1939	INVENTORY [2] 1940	INVENTORY [2] 1941
Apr.	4,310	5,092	5,823	4,458	5,037	6,050	9,813	10,867	9,958
May	4,473	5,413	6,073	4,800	5,755	7,733	9,540	10,523	8,373
June	4,976	5,131	6,363	5,849	6,803	7,664	8,632	8,871	7,079

AUTOMOBILE INNER TUBES

Production Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	12,823	12,553	11,891	15,831	7,314	12,383	12,801	15,349
Apr.-June	13,191	11,631	14,624	15,413	7,380	11,847	13,703	17,631
July-Sept.	10,321	11,270	15,320	12,038	10,794	13,118	12,425	
Oct.-Dec.	9,891	12,425	15,201	9,092	12,360	13,300	13,308	
Total	46,226	47,879	57,036	52,374	37,848	50,648	52,237	

Shipment Figures on Quarterly Basis

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,640	11,252	11,367	14,606	7,387	11,422	11,683	14,265
Apr.-June	14,553	11,928	15,113	15,495	9,564	13,010	14,978	18,617
July-Sept.	11,545	13,251	15,069	12,901	11,243	13,449	11,344	
Oct.-Dec.	8,306	11,636	12,874	9,765	12,099	13,309	14,209	
Total	45,044	48,067	54,423	52,767	40,293	51,190	52,214	

Inventory Figures [2]

Quarter	1934	1935	1936	1937	1938	1939	1940	1941
Jan.-Mar.	10,244	10,406	8,660	11,993	10,547	8,752	8,110	8,143
Apr.-June	8,795	10,050	8,075	11,833	8,337	7,549	6,848	7,054
July-Sept.	7,639	7,565	8,595	11,326	7,859	7,206	7,970	
Oct.-Dec.	9,180	8,231	10,945	10,312	8,166	7,036	7,017	

Figures for Recent Months

	PRODUCTION 1939	PRODUCTION 1940	PRODUCTION 1941	SHIPMENTS 1939	SHIPMENTS 1940	SHIPMENTS 1941	INVENTORY [2] 1939	INVENTORY [2] 1940	INVENTORY [2] 1941
Apr.	3,852	4,615	5,496	3,940	4,547	5,371	8,653	8,191	8,143
May	3,746	4,737	5,855	4,034	4,745	6,324	8,373	8,206	7,686
June	4,249	4,351	6,280	5,036	5,686	6,922	7,549	6,849	7,054

[1] These figures are based on reports received from the Rubber Manufacturers Association. They are revised frequently and the latest available issue should be consulted for most reliable figures.
[2] Stocks held by manufacturers at end of period indicated.

Automobile Production

Year	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1934	2,753,111	2,177,919	575,192	116,852	92,647	24,205	2,869,963
1935	3,946,934	3,252,244	694,690	172,877	135,562	37,315	4,119,811
1936	4,454,115	3,669,528	784,587	162,159	128,369	33,790	4,616,274
1937	4,808,974	3,915,889	893,085	207,463	153,046	54,417	5,016,437
1938	2,489,085	2,000,985	488,100	166,086	123,761	42,325	2,655,171
1939*	3,577,292	2,866,796	710,496	155,426	108,369	47,057	3,732,718
1940	4,469,354	3,692,328	777,026	222,984	110,126	112,858	4,692,338
1941							
Jan.*	500,863	411,233	89,630	23,195	11,990	11,205	524,058
Feb.*	485,616	394,513	91,103	23,710	10,647	13,063	509,326
Mar.*	507,805	410,196	97,609	26,044	12,093	13,951	533,849
Apr.*	462,270	374,979	87,291	27,584	12,091	15,493	489,854
May	518,748	417,698	101,050	26,585	9,840	16,745	545,333
June	520,521	418,983	101,538	25,753	8,538	17,215	546,274
July	444,103	343,748	100,355	24,654	3,849	20,805	468,757
Aug.	.....	.....	.....	.....	.....	.....	.....
Sept.	.....	.....	.....	.....	.....	.....	.....

* Revised.
Note: U. S. figures represent factory sales; Canadian, production.

Exports of Crude Rubber from Principal Producing Countries

(Long Tons)

	—BRITISH MALAYA— Gross Exports	Imports	Net Exports	Ceylon	India & Burma	Sarawak	British North Borneo	Thailand	NETHERLAND INDIES Java & Madura	Sumatra E. Coast	Other N.I.	Indo-China	Amazon Valley	All Other	World Total
1923	252,016	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,697	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,082	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,536
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,582	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,735	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,292	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933	573,412	167,377	406,035	63,351	4,527	10,874	7,555	7,765	73,851	91,861	149,659	18,394	9,883	2,737	846,312
1934	677,361	211,803	465,558	79,746	10,492	17,233	11,103	17,545	87,400	112,058	175,470	20,170	8,903	2,985	1,008,663
1935	590,319	174,652	415,667	54,316	13,968	19,465	8,885	28,327	57,488	78,325	139,297	28,816	11,275	8,745	864,574
1936	520,286	167,799	352,487	49,692	14,724	21,243	8,177	33,702	61,307	84,577	152,205	40,782	14,193	11,466	845,431
1937	681,638	213,446	468,192	70,353	17,015	25,922	13,213	5,551	84,085	139,632	207,863	43,399	15,576	13,063	1,133,864
1938	526,911	156,101	370,810	49,528	15,178	17,792	9,512	41,080	57,526	94,501	145,909	58,518	14,618	12,920	887,892
1939	553,324	177,851	375,473	61,026	15,881	24,014	11,864	41,266	72,786	117,791	181,272	65,140	13,892	22,224	1,002,629

	British Malaya [1]	N.E.I.	Ceylon [2]	India & Burma [2]	North Borneo	Sarawak	Thailand	Indo-China	Oceania	Africa [3]	Liberia	South America	Mexico (Guayule)	Grand Total
1940	540,417	537,733	88,937	23,317	17,623	35,166	43,940	64,437	2,300	9,903	7,223	17,601	4,007	1,392,604
1940:														
April	25,454	44,416	4,144	1,807	1,799	2,951	1,834	2,927	203	720	598	1,159	317	88,329
May	57,874	40,436	7,337	2,018	1,370	2,696	2,582	4,578	195	961	364	2,305	331	123,047
June	45,471	44,834	5,603	1,553	1,421	4,077	2,178	2,730	168	727	405	1,080	101	110,348
July	42,861	60,482	7,330	1,194	1,767	2,494	4,253	4,045	169	800	342	1,035	443	127,215
Aug.	45,872	45,078	8,139	1,332	1,593	2,640	4,345	7,337	285	800	308	1,233	327	120,729
Sept.	58,892	44,009	9,985	1,319	1,743	2,404	3,247	9,303	100	800	323	1,295	200	133,715
Oct.	52,767	50,139	8,127	1,841	1,693	2,564	3,355	2,082	200	800	600	1,860	200	126,228
Nov.	36,045	37,387	5,623	2,626	1,130	3,360	3,463	6,715	200	800	600	1,500	200	99,649
Dec.	56,263	35,325	10,700	3,405	1,028	3,520	5,343	9,000	200	600	813	1,427	392	128,216
1941:														
Jan.	37,804	58,593	7,858	955	2,085	2,445	2,137	9,058	333	800	750	2,103	448	125,369
Feb.	27,115	42,091	4,346	1,022	1,686	2,922	4,137	1,995	200	800	828	1,814	282	89,238
Mar.	56,651	53,233	6,074	1,285	1,154	3,726	5,712	6,286	200	800	958	2,835	250	139,164
Apr.	41,206	48,915	6,991	1,164	2,175	3,118	4,271	3,000	250	800	750	2,009	250	114,899
May	33,062	48,029	7,786	1,019	1,237	3,849	1,841	3,500	200	800	750	1,080	250	123,403

(1) Including Brunei and Labuan; figures shown represent rubber which has actually been shipped and include rubber from the free stocks in Singapore and Penang. (2) Exports of domestic produce. (3) Exclusive of Liberia. Notes: Figures shown prior to 1940 were furnished by the United States Department of Commerce. Figures since 1940 were furnished by the International Rubber Regulation Committee, which accounts for the difference in the principal producing countries shown. Many figures for current months are provisional only and are later revised when more definite statistics are available. Therefore, it is suggested that figures from the most recent issue should be taken as more reliable.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(Long Tons)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,801
1920	249,530	56,844	13,886	11,890	11,746	5,297	6,123	62	1,815	2,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,020
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,319	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,646	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,391	12,018	9,490	2,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,498	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,022	6,440	864	4,650	894,638
1930	458,056	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,243	7,831	5,520	10,402	772,803
1934	439,172	158,482	49,560	59,330	28,439	69,905	21,398	47,271	9,642	9,115	3,758	12,418	6,900	10,999	926,389
1935	455,758	128,829	51,450	62,899	26,870	57,567	21,880	37,372	9,978	7,593	4,068	11,878	8,140	11,245	895,727
1936	475,359	—2,591	57,032	71,794	27,871	61,223	16,534	30,967	14,109	9,648	2,888	11,236	6,668	8,772	791,510
1937	592,394	92,707	59,871	98,170	36,088	62,311	24,733	30,462	19,164	14,970	4,343	4,680	2,400	13,063	1,055,356
1938	406,343	133,079	59,660	90,200	25,696	45,836	28,170	25,650	11,944	11,309	5,092	16,034	2,400	9,936	871,349
1939	486,348				31,615	42,352			15,426	9,612	7,051				
1940	811,364														
1939:															
Sept.	36,197	4,406	4,000*	....	2,639	9,254	1,500*	2,000*	875	108	222	1,200*	200*	...	62,601
Oct.	39,735	8,530	5,000*	....	5,787	2,749	1,500*	2,000*	1,235	519	653	1,200*	200*	...	69,108
Nov.	41,478	10,500*	5,000*	....	1,709	5,104	1,500*	2,000*	1,200*	667	613	1,200*	200*	...	71,171
Dec.	70,302	5,200*	5,000*	....	3,025	3,961	1,500*	2,000*	1,200*	1,035	1,827	1,200*	200*	...	96,450
1940:															
Jan.	71,565	450	5,000*	....	5,047	4,540	1,500*	2,000*	1,921	891	682	1,200*	200*	....	....
Feb.	41,797	7,500	5,000*	....	3,508	5,241	1,500*	2,000*	1,846	694	495	1,200*	200*	....	....
Mar.	58,302	14,200	5,000*	....	3,062	6,057	1,500*	2,000*	1,784	....	627	1,200*	200*	....	....
Apr.	70,135	16,400	5,000*	....	3,096	2,000*	1,500*	2,000*	1,612	....	....	1,200*	200*	....	....
May	50,610	10,000	5,000*	....	3,108	2,500*	1,500*	2,000*	2,128	....	....	1,200*	200*	....	....
June	53,266	9,500	5,000*	....	1,062	3,000*	1,500*	2,000*	1,181	....	....	1,200*	200*	....	....
July	69,496	19,500	5,000*	....	5,112	3,000*	1,500*	2,000*	1,902	....	....	1,200*	200*	....	....
Aug.	72,612	21,250	5,000*	....	4,605	4,500*	1,500*	2,000*	2,508	....	....	1,200*	200*	....	....
Sept.	78,306	25,940	5,000*	....	2,743	....	1,500*	2,000*	2,485	....	....	1,200*	200*	....	....
Oct.	74,400	.....	5,000*	....	8,336	....	1,500*	2,000*	590	....	....	1,200*	200*	....	....
Nov.	72,775	.....	5,000*	....	5,451	....	1,500*	2,000*	1,366	....	....	1,200*	200*	....	....
Dec.	97,794	.....	5,000*	....	7,437	....	1,500*	2,000*	721	....	....	1,200*	200*	....	....
1941:															
Jan.	86,541	.....	5,000*	....	6,290	....	1,500*	2,000*	1,065	....	....	1,200*	200*	....	....
Feb.	73,647	.....	5,000*	....	3,770	....	1,500*	2,000*	1,717	....	....	1,200*	200*	....	....
Mar.	86,794	.....	5,000*	....	3,879	....	1,500*	2,000*	3,486	....	....	1,200*	200*	....	....
Apr.	63,071	.....	5,000*	....	2,531	....	1,500*	2,000*	2,326	....	....	1,200*	200*	....	....

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1]—United States imports of guayule are included in this compilation. *—Figure is provisional; final figure will be shown when available.

NOTE: ANNUAL FIGURES ARE MORE ACCURATE; THEY ARE REVISED AT THE END OF THE FOLLOWING YEAR.

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Industry.

The Market Place

If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials —

ACCELERATORS—
El-Sixty; Ureka; Ureka C; Guantal; Santocure; Pipsolene; RN-2 Crystals; DPG; Pip Pip; A-32; A-100; R-2 Crystals; A-10 • ANTIOXIDANTS —Flectols B, H, White; Santoflex B; Santovar A.
MONSANTO CHEMICAL CO.
Rubber Service Division
1012 Second National Bldg., Akron, Ohio

CARBON BLACK— *Micronex*
the world's standard gas black, universally known as the "King of Rubber Pigments."
Binney & Smith Co.
41 East 42nd St. New York City

CHEMICALS

For Rubber	For Industry Generally	
Accelerators	*Acids*	*Latex*
Antioxidants	*Oil of Myrbane*	*Lotol*
Specialties	*Aniline Oil*	*Dispersions*

NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 SIXTH AVE. NEW YORK

AERO BRAND RUBBER CHEMICALS
DPG—DOTG—Accelerator 49
Rubber Sulphur
American Cyanamid & Chemical Corporation
30 Rockefeller Plaza, New York, N. Y.

CARBON BLACK
CONTINENTAL
The Newest Name in Carbon Black offers
CONTINENTAL DUSTLESS
CONTINENTAL COMPRESSED
CONTINENTAL UNCOMPRESSED
Continental Carbon Company
295 Madison Ave., New York, N.Y.

CHEMICALS AND MINERAL
Ingredients—Whiting, Clay, Tale, Barytes, Colors. Heavy Calcined Magnesia. Carbonate of Magnesia, Pumice Stone.
Standard Since 1890
Whittaker, Clark & Daniels, Inc.
260 West Broadway New York

ALUMINUM FLAKE
A uniform, fine, low gravity, white reinforcing pigment. *Furnished to the rubber trade for 38 years.*
The Aluminum Flake Co.
Akron, Ohio

CARBON BLACK— *Aerfloted*
Arrow Black for rubber compounding. Standard for grit-free uniformity.
J. M. Huber, Inc.
460 West 34th St. New York

COAL TAR CHEMICALS

Coumarone Resins	Tack Producers
Resinous Oils	Dispersing Oils
Reclaiming Oils	Softeners
Solvents	

The Neville Company
Neville Island, Pittsburgh, Penna.

ANTIMONY Pentasulphide, golden and crimson, very fine, pure.
Rare Metal Products Co.
Belleville, N. J.
Direct Factory Representation

CARBON BLACK
DIXIE...KOSMOS
Used throughout the world
UNITED CARBON COMPANY
Charleston, W. Va.
New York • Akron • Chicago

COLLOIDAL SULPHUR
COLLOIDAL ZINC OXIDE
COLLOIDAL COLORS
HEVEATEX CORPORATION
78 Goodyear Ave. Melrose, Mass.
Offices in New York, Akron, Chicago

ASBESTINE—Specially prepared for use in Rubber. Send for liberal working samples.
SOLE PRODUCERS
International Pulp Co.
41 Park Row New York City

CARBON BLACK
WITCO DISPERSO
and DUSTLESS and a
Complete Line of High Quality
Rubber Chemicals
Wishnick-Tumpeer, Inc.
295 Madison Ave., New York, N.Y.

COLORS
Harmon Organic Rubber Color Granules are bright in shade and fast in cure. *Easy to weigh—Easy to disperse —Economical—Will not dust or fly.*
Harmon Color Works, Inc.
Paterson, N. J.

CALCENE—The Ideal low gravity, white reinforcing pigment. Gives high tensile and elongation properties with exceptionally good resistance to tear and abrasion.
PITTSBURGH PLATE GLASS CO.,
COLUMBIA CHEMICAL DIV.
30 Rockefeller Plaza, New York, N. Y.

CATALPO—The universal and standard rubber pigment now being used in treads, solids, tubes, carcass frictions, etc.
Moore & Munger
33 Rector Street New York City

COLORS
BRILLIANT ORGANIC DYES; PERMANENT, NON-BLEEDING, LOW COST
For All Cures
MONSANTO CHEMICAL CO.
Rubber Service Division
1012 Second National Bldg., Akron, Ohio

CAMELINE WHITE CALCITE **FILLER**
99.75% 325 mesh, more than 90% minus 25 microns; soft, thin, platy particles, assuring better tensile, flexing and elongation.
HARRY G. HOEHLER
YORK, PA.

CHEMICALS
Carbon Black—Clay—Colors
Accelerators—Sulphur
Stocks Carried At All Times
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

COMPOUNDING Materials

Vulcanizing Agents	Pigments
Accelerators	Clays
Antioxidants	Mineral Rubber
Plasticizers	Aromatics
Dispersions	Blacks

R. T. VANDERBILT CO.
230 Park Ave. New York City

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Chemicals and Compounding Materials (continued)

CROWN CLAY
An Approved Clay for Rubber Compounding
Southeastern Clay Co.
Aiken South Carolina

MAGNESIUM SALTS
"MARINCO" Magnesium Carbonates, Hydroxides, Oxides
U.S.P. Technical and Special Grades
Marine Magnesium Products Corporation
South San Francisco, California

STEARIC ACID
STEAREX . . . CAKE or POWDER
STEAREX BEAD
Standardized Products for Rubber Compounding
MINERAL RUBBER (Parmr), TALC
SOAPSTONE
Binney & Smith Co.
41 East 42nd St. New York City

CUMAR —Paracoumarone Resin.
A neutral gum for rubber compounding.
Samples and prices on request.
The Barrett Company
40 Rector St. New York City

MAPICO COLORS
Pure Oxides of Iron
Yellows—Reds—Browns—Black
MAGNETIC PIGMENT CO.
Manufacturers
BINNEY & SMITH CO.
Distributors
41 East 42nd Street, New York, N. Y.

SULPHURS
Rubbermakers' TIRE BRAND and TUBE BRAND. Also CRYSTEX Insoluble Sulphur, Sulphur Chloride, Caustic Soda, Carbon Bi-Sulphide, Carbon Tetra-Chloride.
Stauffer Chemical Company
2710 Graybar Bldg., New York City

DU PONT Rubber Chemicals
DU PONT RUBBER COLORS
DU PONT ACCELERATORS
DU PONT ANTI-OXIDANTS
E. I. du Pont de Nemours & Co., Inc.
RUBBER CHEMICALS DIVISION
WILMINGTON, DELAWARE

PARA-DORS—
overcome odors in rubber—effectively and at low cost.
GIVAUDAN-DELAWANNA, INC.
Industrial Aromatics Division
330 West 42nd St., New York, N. Y.

TITANIUM PIGMENTS
TITANOX-A (Titanium Dioxide)
TITANOX-B (Titanium Barium Pigment)
TITANOX-C (Titanium Calcium Pigment)
TITANOX-L (Lead Titanate)
TITANIUM PIGMENT CORP.
SELLING AGENTS
111 Broadway, New York, N. Y.
104 S. Michigan Ave., Chicago, Ill.

FACTICE—Prevents blooming, makes colors fast and a smoother batch.
Stamford Rubber Supply Co.
Stamford, Conn.

PARA-FLUX
The Universal Softener—Adaptable, Uniform. Improves Quality—Economical.
The C. P. Hall Co.
2510 First Central Tower
Akron Ohio

ZINC OXIDES
AZO ZZZ Zinc Oxides
lead free—pure—uniform—dependable
AZO ZZZ-11 AZO ZZZ-55
AZO ZZZ-22 AZO ZZZ-44 AZO ZZZ-66
American Zinc Sales Company
Columbus, Ohio *New York*
Chicago *St. Louis*

FURNEX—FURNEX BEADS
—A cool mixing reinforcing black for Footwear and Mechanicals. Good ageing —Improved oil resistance.
Binney & Smith Co.
41 East 42nd St. New York City

PELLETEX (The pellet *Gastex*)
The special process reinforcing black in free-flowing form. Saves power; none wasted; protects adjacent colored stocks.
GENERAL ATLAS CARBON DIV.,
GENERAL PROPERTIES CO., INC.
60 Wall St. New York

ZINC OXIDE PIGMENTS
The XX Reds Kadox
ZINC SULPHIDE PIGMENTS
The Cryptones The Albaliths
(Lithopones)
The New Jersey Zinc Sales Co.
New York *Chicago*
Cleveland, Boston, San Francisco

GASTEX
Special Process Reinforcing BLACK. Superior aging and oil resistant properties. Low permanent set.
GENERAL ATLAS CARBON DIV.,
GENERAL PROPERTIES CO., INC.
60 Wall St. New York

RUBBER PROCESSING OILS
For outstanding compatibility in processing natural or modern synthetic rubbers, use
SUN RUBBER PROCESSING OILS
Write
SUN OIL COMPANY
Philadelphia Pennsylvania

ZINC OXIDES
Black Label Red Label Green Label
Manufactured by Our New Electrothermic Process
St. Joseph Lead Co.
250 Park Ave., New York
Plant and Laboratory: Monaca (Josephtown), Pa.

IRON OXIDES
Asbestine—Barytes—Talc—Soapstone
C. K. Williams & Co.
EASTON, PA.

RUBBER SUBSTITUTES
White, brown and black.
The Carter Bell Mfg. Co.
Springfield, New Jersey

ZINC STEARATE
ZINC LAURATE
Colite Mold Lubricant for Extra High Gloss
THE BEACON COMPANY
87 Bickford St., Boston, Mass.

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Machinery and Equipment

CALENDER SHELLS
Gammeter's
ALL STEEL Calender Shells.
All welded. Any size.
New and better.
The W. F. GAMMETER CO.
Cadiz Ohio

CUTTING DIES
Cutting and perforating dies of all types for rubber manufacturers.
Send for our quotations
Brockton Cutting Die & Machine Co.
Avon, Mass.

CUTTING MACHINERY
Specialists in Rubber Cutting Equipment for Bands, Crude Stock, Jar Rings, Tubes, Rollers, Washers, Treads, Cement Stock, etc.
See Black Rock for All Cutting Problems
Black Rock Manufacturing Co.
179 Osborne St. Bridgeport, Conn.

DIAL GAUGES—Thickness
For measuring the thickness of rubber and similar materials. Many models.
Frank E. Randall
248 Ash St.,
Waltham Mass.

EXTRUDERS
The pioneer line of tubers, strainers and wire insulating machines. For latest developments inquire of
JOHN ROYLE & SONS
Paterson New Jersey

FORMS - PORCELAIN
Exclusive Manufacturers of Vitreous Porcelain Closed End Forms
No matter what shape or design—we can make it. Send blue print or sketch for our prices.
The Colonial Insulator Co.
Akron, Ohio

GAUGES—
Diameter and thickness gauges in pocket and larger sizes for quick and accurate measurement of rubber.
B. C. AMES COMPANY
Waltham Mass.

GRINDING MILLS
SPAN grinding mill reduces soft and hard rubber to fine powder.
Made in U. S. A.
M. Pancorbo
155 John St. New York, N. Y.

HYDRAULIC PRESSES
for
RUBBER and PLASTICS
The McKinnon Iron Works Co.
Ashtabula Ohio

MACHINERY
L. ALBERT & SON
Trenton, N. J. Akron, O.
Los Angeles, Calif.

MACHINERY—RUBBER
"MASTER" Tube Molds, Tire Vulcanizers, Molds and Cores, Tire Drums, Tubers, etc.
Special Machinery Built to Order
Akron Standard Mold Co.
Akron, Ohio

MACHINERY
A complete service from the design of machinery to finished products of all kinds. Plant layouts — Formulas — Processes. Specializing in Latex Equipment.
Continental Machinery Company
305 BROADWAY, NEW YORK, N. Y.

MACHINERY
Cutting, Trimming, Skiving, Cementing, Eyeletting, Cutting Dies—Eyelets.
United Shoe Machinery Corp.
140 Federal St., Boston, Mass.

MAGNETIC EQUIPMENT of All Kinds
Separators Drums
Clutches Brakes
Rolls Special Magnets
Stearns Magnetic Mfg. Co.
640 So. 28th St., Milwaukee, Wis.

MANDRELS—All Types
Circular and Straight—Aluminum and Steel Licensed Under Clyde E. Lowe Co. Patents
Sherardizing and Chrome Plating Machinery—Air Bag & Mandrel Polishing
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

MIXERS
ROSS Improved Mixers for cutting rubber cements. Standard Mixers, 50-500 gallons; Change Can Mixers, 5-50 gallons.
Send for Catalogue
Charles Ross & Son Company
158 Classon Ave., Brooklyn, N. Y.

MOLDS
For tires, rubber specialties and mechanical goods; general machine work.
The Akron Equipment Co.
Akron, Ohio

NEW AND USED
RUBBER MACHINERY
Send us your inquiries and list of machinery you have for sale.
M. Norton & Co.
Medford Mass.

SHOE MACHINERY
Bed Lasters
Clickers or Cutting Machines
Skiving Machines
Lacing Machines (same as Ensign Type)
Hamlin Machine Company
67 Maplewood St. Malden, Mass.
N. W. MATHEY, Owner

SPECIAL MACHINERY
For Quality and Efficiency in Working Rubber. Consult us about your problems.
Utility Manufacturing Co.
Cudahy, Wisconsin

STOCK SHELLS
A Type for Every Need—Large Diameter—Light Weight — Extra Strong — Seamless.
National Sherardizing & Machine Co.
Hartford, Conn. Akron, Ohio

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Machinery [Cont'd]

TESTING MACHINES
RUBBER TENSILE TEST MACHINES
TEXTILE TESTING MACHINES
Write for Descriptive Literature
Henry L. Scott Co.
P. O. Box 963 Providence, R. I.

THE MARKET PLACE
is the acknowledged Buyers' Guide to products and services in the rubber industry.
Use it—for RESULTS!

WHAT DO YOU WANT TO SELL?
Whether it is vulcanizers, gauges, dies, molds, mills or calenders, a card in this space will help you. Buyers consult these pages—put your products before them!

Reclaimed Rubber . . . .

RECLAIMED RUBBER—
For All Purposes
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
1230 Sixth Ave., N. Y. City

RECLAIMED RUBBER—
Uniformity, reliability, cleanliness
Pequanoc Rubber Co.
Butler, N. J.

RECLAIMED RUBBER—
A standardized grade for every requirement.
U. S. Rubber Reclaiming Co., Inc.
500 Fifth Ave., New York, N. Y.
"58 Years Serving the Industry Solely as Reclaimers"

The Progressive Concern Selling to Rubber Manufacturers Uses THE MARKET PLACE for Results

Rubber—Crude, Scrap; Latex; Dispersions

CREPE RUBBER
Specialists in
Latex Crepe
Charles F. Connor & Co., Inc.
110 State St., Boston, Mass.
Telephone: LAFayette 3690

CRUDE RUBBER
LATEX, BALATA
GUTTA-PERCHA, GUTTA-SIAK
Robert Badenhop Corporation
Woolworth Bldg., New York City

CRUDE RUBBER
SCRAP RUBBER
Also HARD RUBBER DUST
H. Muehlstein & Co., Inc.,
122 E. 42nd St., New York City
BRANCHES: Akron, Chicago, Boston Detroit, Los Angeles, London, Paris

CRUDE RUBBER
SCRAP RUBBER
HARD RUBBER DUST
BALATA — GUTTA PERCHA
Hermann Weber Company
67 Broad St., New York

CRUDE RUBBER
LIQUID LATEX
Members of the Commodity Exchange, Inc., and Commodity Exchange Rubber Clearing Ass'n., Inc.
Charles T. Wilson Co., Inc.
120 Wall St. New York
AKRON OFFICE: 803 United Building

DISPERSITE
Water Dispersed Rubber
(Reclaimed—Crude—Synthetics)
Man-made Alternate for Latex
Dispersions Process, Inc.
1230 Sixth Ave., New York, N. Y.
Offices in Detroit, Boston, Indianapolis

GUAYULE "Duro" Brand and AMPAR Rubber, washed and dried ready for compounding.
High Grade PLANTATION RUBBER from our own Estates
Continental Rubber Co. of N. Y.
745 Fifth Avenue New York

LATEX
Normal, Concentrated, Processed
HEVEATEX CORPORATION
78 Goodyear Ave., Melrose, Mass.
Offices in New York, Akron, Chicago

LOTOL
(Compounded Latex)
Ready to use
NAUGATUCK CHEMICAL
Division of United States Rubber Co.
Rockefeller Center, New York, N. Y.
Offices in Detroit, Boston, Indianapolis

REVERTEX
Highly Concentrated (About 75%)
Rubber Latex
Sole Distributor for U. S. A. and Canada
Revertex Corp. of America
37-08 Northern Blv'd., L. I. City, N. Y.

RUBBER
Crude Rubber
Liquid Latex
Ernest Jacoby & Co.
79 Milk St. Boston, Mass.
Cable Address: Jacobite Boston

RUBBER—
Scrap and Crude
Also HARD RUBBER DUST
A. Schulman, Inc.
Darrow Road, Akron, Ohio
1401 Mississippi Ave., E. St. Louis, Ill.
736 Statler Bldg., Boston, Mass.
Warehouses at Akron and E. St Louis

VULTEX— THE ONLY VULCANIZED LATEX
Insures Highest Quality, Uniformity, Economy, Simplicity of Application.
FULLY PROTECTED BY PATENTS
Also Latex and Latex Compounds
General Latex & Chemical Corp.
Successors to the Vultex Chemical Company
666 Main St. Cambridge, Mass.

YOUR PRODUCTS
Should be displayed in
THE MARKET PLACE
Show What You Have to Sell

The Market Place

The WHERE-TO-BUY Section of THE RUBBER AGE in which are listed the Products and Services of the Leading Suppliers to the Rubber Industry. If what you are seeking is not listed here, write to the Service Department of THE RUBBER AGE, 250 West 57th St., New York, N. Y.

Rubber Mnfrs.

MECHANICAL MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
Your Inquiries Solicited
Barr Rubber Products Co.
Sandusky, Ohio

SANITARY GOODS—
Dress Shields, Baby Pants, Aprons, Elastic Belts, Bloomers, Stepins, Bibs, Guimps and Brassieres.
SPECIAL GOODS CUT TO ORDER
Rand Rubber Co., Inc.
Summer Ave. & Halsey St., Brooklyn, N. Y.

SOFT MOLDED RUBBER GOODS
Made to Your Specifications
R. W. Rhoades Metaline Co., Inc.
30 West Ave., Long Island City, N. Y.

Consultants

CONSULTING LATEX TECHNOLOGIST
R. J. Noble, Ph.D.
21 Woodland Road, Malden, Mass.

CONSULTING
Rubber Technologist
R. R. Olin Laboratories
P. O. BOX 372, AKRON, OHIO
Telephones: Sherwood 3724, Franklin 8551

Do you believe in Your Products?
Then you should believe in telling the rubber industry about them. The MARKET PLACE is the logical place to display your wares.

Fabrics—Liners, Hollands

CUSTOM FINISHERS of
RUBBER REPELLENT LINERS
Capitol Process Liner Treatment
Textile Proofers, Inc.
One Gates Ave. Jersey City, N. J.

LINERS TREATED
Advantages of Porotex Treatment
1. All Compounds stripped easily. 2. Wrinkles never cause liners to crack. 3. Prevents rot; liners rendered heat and oil-proof. 4. Liners remain porous, reducing tendency to trap air.
POROTEX PRODUCTS
875 East 140th St. Cleveland, Ohio

PROCESSED LINERS
"CLIMCO"—Fabrics treated to prevent adhesion of rubber stocks.
"LINERETTE"—Treated paper for separating or interleaving light weight rubber stocks.
The Cleveland Liner & Mfg. Co.
5508 Maurice Ave., Cleveland, Ohio

WANT ADS—

RATES: Five cents per word, minimum charge, $2.00, except POSITIONS WANTED, $1.00 for 40 words or less, extra three cents per word. All classified advertisements payable in advance. Address replies to box numbers care of RUBBER AGE, 250 West 57th St., New York.

POSITIONS WANTED

CHEMIST—with over 11 years' experience in rubber research and compounding, including development of synthetic rubbers and their processing and compounding. Have full knowledge of development and manufacture of tires, mechanicals, proofed goods, latex and latex sponge, dipped goods, etc. Age 37. Available immediately. Address Box 1141, RUBBER AGE.

EXPERIENCED COLOR CHEMIST seeks position. Will also accept employment as color mixer. Moderate salary requirements. Address Box 1158, RUBBER AGE.

POSITION with small progressive concern. Over 20 years in supervision, compounding, estimating and pinch sales. Experienced production of any type, dense or sponge rubber. Immediate salary not so important as is permanent connection. Address Box 1172, RUBBER AGE.

PRACTICAL compounding rubber chemist with excellent theoretical background. Experience with synthetics and all types of rubber compounds. Have knowledge of casting. Desires change. Address Box 1168, RUBBER AGE.

RUBBER CHEMIST—Three years' experience in the compounding of rubber and all synthetics, plant and laboratory management, molding and processing problems. Desires responsible position. Available short notice. Address Box 1163, RUBBER AGE.

RUBBER TECHNOLOGIST, thoroughly familiar compounding, manufacture, and testing of rubber products. Fourteen years' broad experience. Graduate chemist. Consider position as superintendent of small, well-established company. Location immaterial. Address Box 1171, Rubber Age.

HELP WANTED

EXPERIENCED SALESMAN to handle rolls, molded goods and extruded parts in New York City and New England. State all qualifications. Address Box 1169, RUBBER AGE.

EQUIPMENT WANTED

WANTED FOR USER: 1—#3 or #9 Banbury Mixer; 3—Mills; 1—Calender; 5—Hydraulic Presses, with pumps and accumulators; 2—Tubers. Address Box 1014, RUBBER AGE.

BUSINESS OPPORTUNITIES

500 house organs $15.00; 1,000 $20.00. Good will and sales builder. Your ad front cover. Get samples. CRIER (11) 1840 East 87th St., Cleveland, Ohio.

EQUIPMENT FOR SALE

FOR SALE: BANBURY MIXER SIZE #11 WITH REDUCTION GEARS—PRACTICALLY NEW CONDITION. ADDRESS INQUIRY, IF INTERESTED, TO ARMSTRONG CORK COMPANY, LANCASTER, PENNSYLVANIA, ATTENTION OF MR. W. ARTHUR ABEL.

FOR SALE: 1—84" Heavy Duty Mill, also 1—60"; 1—50"; 1—36"; 12—30" x 40"; 1—38" x 78" Hydraulic Presses; 7—Hydraulic Pumps; 1—W.S. Hydro-Pneumatic Accumulator 2500 lbs., 8 gal. Also Mills, Calenders, Tubers, W. & P. Mixers, etc. CONSOLIDATED PRODUCTS CO., INC., 14-19 Park Row, New York, N. Y.

FOR SALE: 1 Rubber Mill, 36" in working condition. Located in New York. Address Box 1170, THE RUBBER AGE.

FOR SALE: 2—600 gal. Steel Cement Churns; Length, 8'; Diameter, 4'; Thickness of shell, ½" riveted and welded; Shaft, 13' x 2 7/16th in.; 40 Paddles, 3" x 22"; Price—$900. each, FOB Lawrence, Massachusetts. Adress Box 1173, Rubber Age.

INDEX TO ADVERTISERS

Advance Solvents & Chemical Corp. —
Akron Equipment Co. 443
Akron Standard Mold Co. 443
Albert & Son, L. 443
Aluminum Co. of America 384
Aluminum Flake Co. 441
Aluminum Ore Co. 384
American Cyanamid & Chemical Corp. 375, 441
American Firstoline Corp. —
American Zinc Sales Co. 380, 442
Ames, B. C., Co. 443
Arkwright Finishing Co. —

Badenhop Corp., Robert 424, 444
Baird Rubber & Trading Co., Inc. 427
J. T. Baker Chemical Co. 425
Barr Rubber Products Co. 445, 446
Barrett Co., The 385, 442
Beacon Co. 442, 446
Binney & Smith Co. Insert Following 410, 441, 442
Black Rock Mnfg. Co. 443
Brockton Cutting Die & Machine Co. 443

Carter Bell Manufacturing Co., The 433, 442
Chemical Industries, 18th Exposition of 386
Cleveland Liner & Mnfg. Co. 390, 445
Colonial Insulator Co. 443
Columbian Carbon Co. Insert Following 410, 441
Connor, Charles F., & Co., Inc. 444
Continental Carbon Co. Insert Following 372, 441
Continental Machinery Co. 443
Continental Rubber Co. 444

Dispersions Process, Inc. 444
Du Pont de Nemours & Co., E. I. Inside Front Cover, 442

Eastern Engineering Co. —

Farrel-Birmingham Co., Inc. —

Gammeter, W. F., Co. 433, 443
General Atlas Carbon Div. 379, 442
General Latex & Chemical Corp. 444
Givaudan-Delawanna, Inc. 442

Hall Co., The C. P. 426, 442
Hamlin Machine Co. 443
Harmon Color Works, Inc. 428, 441
Heveatex Corporation 388, 441, 444
Hoehler, Harry G. 441
Holliday, W. J., & Co. —
Huber, J. M., Inc. 441
Hydrocarbon Chemical & Rubber Co. 397, 426, 428, 433, 435

International Pulp Co. 424, 441
Interstate Welding Service —

Jacoby, Ernest, & Co. 424, 441, 444

McKinnon Iron Works Co., The 443
Magnetic Pigment Co. 377, 442
Marine Magnesium Products Corp. 442
Monsanto Chem. Co. (R. S. Dept.) 378, 441
Moore & Munger 441
Muehlstein & Co., H., Inc. 388, 444

National Carbon Company, Inc. —
National Rosin Oil & Size Co. 424
National Sherardizing and Machine Co. 443, 446
Naugatuck Chem. Div. U. S. Rubber Co. 392, 441, 444
Neville Co. 431, 441
New Jersey Zinc Co. 442
Noble, R. J. 445
Norton, M., & Co. 443

Olin Laboratories, The R. R. 445

Pancorbo, M. 443
Pequanoc Rubber Co. 381, 444
Pittsburgh Plate Glass Co., Columbia Chemical Div. 382, 441
Porotex Products 445

Rand Rubber Co. 445, 446
Randall, Frank E. 431, 443
Rare Metal Products Co. 432, 441
Revertex Corp. of America 433, 444
Rhoades, R. W., Metaline Co., Inc. 445
Ross & Son, Charles 443
Royle & Sons, John 376, 443

St. Joseph Lead Co. 383, 442
Schofield-Donald Co. —
Schulman, A., Inc. Inside Back Cover, 444
Scott Co., Henry L. Outside Back Cover, 444
Skelly Oil Co. —
Southeastern Clay Co. 424, 442
Stamford Rubber Supply Co. 424, 442
Standard Chemical Co. —
Stauffer Chemical Co. 386, 442
Stearns Magnetic Mfg. Co. 432, 443
Sun Oil Co. 442

Textile Proofers, Inc. 445
Thiokol Corporation 387
Titanium Pigment Corp. 389, 442
Trade News Service —

Union Carbide and Carbon Corporation —
United Carbon Co. Insert Following 428, 441
United Shoe Machinery Corp. 382, 443
U. S. Rubber Co., Naugatuck Chemical Div. 392, 441, 444
U. S. Rubber Reclaiming Co. 444
Utility Color Co. —
Utility Mfg. Co. 443

Vanderbilt, R. T., Co. Front Cover, 441

Weber, Hermann, Co. 444
Whittaker, Clark & Daniels, Inc. 428, 441
Williams, C. K., & Co. 432, 442
Wilson Co., C. T. 444
Wishnick-Tumpeer, Inc. 441

Zophar Mills, Inc. 432

AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 Windsor St. Hartford, Conn
Representatives: Akron San Francisco New York

BEACON
Manufacturers of Zinc Stearate, Aluminum Stearate, Calcium Stearate, Magnesium Stearate.
Colite—the Super Mold Lubricant.
A New Price List Available
THE BEACON COMPANY
89 Bickford St. Boston, Mass.

SINCE 1880 RUBBER GOODS
Rand. REG. U. S. PAT. OFF.
"They Last Longer" REG. U. S. PAT. OFF.
DRESS SHIELDS
DRESS SHIELD LININGS
BABY PANTS
BABY BIBS & APRONS
SANITARY WEAR
RUBBERIZED SHEETING
RUBBER APRONS
STOCKINET SHEETS
RUBBER SHEETS
RAINCAPES & COATS
RUBBER SPECIALTIES
DOLL PANTS, CAPES, ETC.
RUBBER DAM & BANDAGES — SHEET GUM
RAND RUBBER CO. BROOKLYN N. Y. U. S. A. MFRS.

MECHANICAL MOLDED RUBBER GOODS
Sponge Rubber: Sheeted—Die Cut—Molded
We Solicit Your Inquiries
THE BARR RUBBER PRODUCTS COMPANY
SANDUSKY, OHIO

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.

BOUND FOR *Beauty*

THERE'S nothing beautiful about this bale of pure white zinc carcass. An hour ago these carcasses were scrap tires in a box car. Our trained crews rolled them into the plant, gave them a "Mechanical Manicure" that stripped them down to the pure white zinc carcass . . . one of the most useful types of scrap rubber.

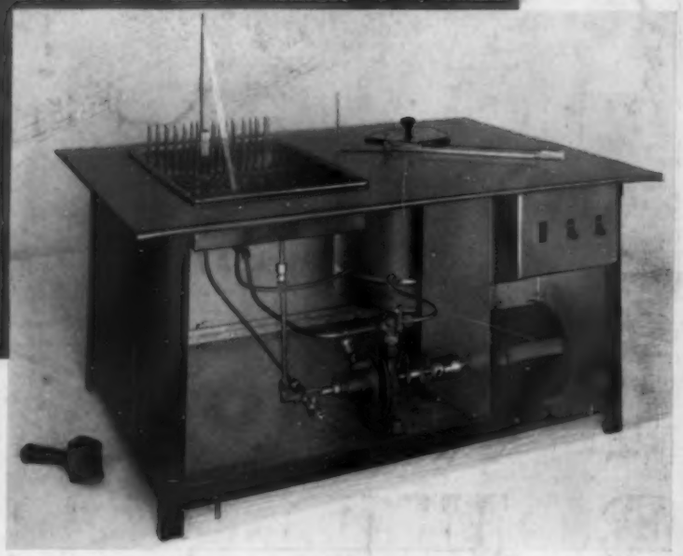
Processors will take this raw material and make it into imitation leather bath mats, automobile mats, rubber floor coverings and other attractive articles.

In our "manicuring" process, tires are sorted into great piles . . . tread and sidewalls cut away . . . beads removed, and after a second inspection, the pure white zinc carcasses are baled and shipped to the industry.

A. SCHULMAN, INC.

AKRON, OHIO • E. ST. LOUIS, ILLINOIS • BOSTON, MASSACHUSETTS

CRUDE RUBBER
SCRAP RUBBER
HARD RUBBER DUST



*SCOTT TESTER T-50 gives the answer

The above *Scott Tester was developed in cooperation with the technical and mechanical staffs of the Naugatuck Chemical Division of the United States Rubber Company. The T-50 Test provides a quick, accurate and convenient method of determining state of cure. Specimens are stretched on racks, cooled to minus 50°-60° Centigrade. Tension on the specimens is then released and they are slowly warmed. As each specimen retracts to 50% of its original elongated length, the temperature is noted. This varies according to the state of cure, and is called the T-50, expressed in Centigrade units plus or minus. Request literature—we'll gladly send it.

SCOTT TESTERS

*Registered Trademark

HENRY L. SCOTT CO.

101 Blackstone St.
Providence, R. I.

Scott Testers — Standard of the World